GOVERNMENT COLLEGEOF ENGINEERING, BARGUR-635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Electrical and Electronics Engineering

CURRICULUM 2025

B.E. –Electrical and Electronics Engineering [Full Time]

Academic Year: 2025-26 Regulation: [R2025]

Program Overview

Program Duration: 4 Years (8 Semesters)

Total Credits Required: 170 Credits

Affiliated University: Anna University, Chennai

NBA Accreditation Status: Accredited

Program Outcomes:

1. **Engineering Knowledge**: Apply math, science, and engineering fundamentals to complex problems.
2. **Problem Analysis**: Identify and analyze complex problems using research and sustainability principles.
3. **Design Solutions:** Design systems and processes considering health, safety, cost, culture, and environment.
4. **Investigations:** Use experiments, modelling, and data analysis to reach valid conclusions.
5. **Engineering Tools:** Apply modern tools for modelling and problem-solving, recognizing their limits.
6. **Society & Environment:** Assess societal, legal, and environmental impacts of engineering solutions.
7. **Ethics:** Commit to ethics, human values, diversity, and legal compliance.
8. **Teamwork:** Work effectively as an individual and in multidisciplinary teams.
9. **Communication:** Communicate clearly in reports, presentations, and documentation across diverse groups.
10. **Management & Finance:** Apply management and economic principles in projects and teamwork.
11. **Lifelong Learning:** Engage in continuous learning, adapt to new technologies, and think critically.

Program Specific Outcome

1. Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate complex engineering problems of electric circuits, analog and digital electronic circuits, electrical machines and power systems.

2. Apply appropriate techniques and modern Engineering hardware and software tools in power systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments.

3. Ability to understand the recent technological developments in Electrical & Electronics Engineering and develop products to cater the societal & Industrial needs.

Credit Distribution Comparison

Component	Anna University	AICTE Norms	GCE Bargur
Mathematics & Basic Sciences (BS)	**25**	**26**	**26**
Humanities & Social Sciences (HS)	**12**	**12**	**13.5**
Engineering Sciences (ES)	**14**	**20**	**18.5**
Professional Core (PC)	**70**	**53**	**71**
Professional Electives (PE)	**21**	**18**	**18**
Open Electives (OE)	**12**	**18**	**12**
Project Work (PR)	**13**	**11**	**12**
Mandatory courses (MC)	**-**	**-**	**-**
Total Credits	**167**	**158**	**171**

Category Abbreviations

BS - Basic Sciences | **ES** - Engineering Sciences | **PC** - Professional Core

PE - Professional Electives | **OE** - Open Electives | **HS** - Humanities & Social Sciences

| **MC** Mandatory courses| **PR** - Project

Notes

- Legend: L - Lecture Hours per Week | T - Tutorial Hours per Week | P - Practical Hours per Week | C - Credits
- Credits are calculated as: L + T + P/2 for theory courses with lab, and based on contact hours for other courses.
- Professional Electives are domain-specific advanced subjects.
- Open Electives can be chosen from any other department to promote interdisciplinary learning.

Changes from previous curriculum R2022:

1. A Theory course C Programming with Applications and its Laboratory are introduced in **first semester**
2. Electrical and Electronics Engineering Practices Laboratory is introduced in **Second Semester**
3. Measurement and Instrumentation Laboratory is introduced in **third semester**.
4. Analog Electronic Circuits is introduced in **Third semester**
5. Linear systems and Signals is introduced in **fourth semester**.
6. Electrical Drives and Control is introduced in **seventh semester**
7. Department Specific Technical Seminar, club activity, Internship, Industry Lecture and Design Project are introduced throughout the curriculum.

SEMESTER-WISE CURRICULUM STRUCTURE (for 8 semesters)

SEMESTER I

S. No	Subject Code	Subject Name	L	T	P	C	Category
1	25ZHS101	English for Engineers-I	3	0	0	3	HS
2	25ZBS102	Matrices and Calculus	3	1	0	4	BS
3	25EBS103	Physics for Electrical Engineers	3	0	2	4	BS
4	25ZBS104	Engineering Chemistry	3	0	2	4	BS
5	25EES105	C Programming with Applications	3	0	0	3	ES
6	25ZMC107	தமிழர் மரபு /Heritage of Tamils	1	0	0	0	MC
7	25EES108	C Programming with Applications Laboratory	0	0	3	1.5	ES
8	25ZHS109	Communication English Laboratory	0	0	2	1	HS
Total			16	1	9	20.5	

SEMESTER II

S.No	Subject Code	Subject Name	L	T	P	C	Category
1	25ZHS201	English for Engineers-II	3	0	0	3	HS
2	25EBS202	Vector, Transforms and Differential Equations	3	1	0	4	BS
3	25EES203	Electric Circuit Analysis	3	1	0	4	ES
4	25EES204	Electron Devices	3	0	0	3	ES
5	25EES205	Electromagnetic Theory	3	1	0	4	ES
6	25ZMC207	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology	1	0	0	0	MC
8	25EES208	Electrical and Electronics Engineering Practices Laboratory	0	0	3	1.5	ES
9	25EES209	Electric Circuits Laboratory	0	0	3	1.5	ES
Total			16	3	6	21	

SEMESTER III

S.No	Subject Code	Subject Name	L	T	P	C	Category
1	25EBS301	Complex Analysis, Difference Equations and Probability & Statistics	3	1	0	4	BS
2	25EPC302	Measurements and Instrumentation	3	0	0	3	PC
3	25EPC303	Magnetics, DC Machines and Transformers	3	1	0	4	PC
4	25EPC304	Analog Electronic Circuits	3	0	0	3	PC
5	25EPC305	Digital Logic Circuits	3	0	0	3	PC
6	25ZMC307	Constitution of India	1	0	0	0	MC
7	25EPC308	Measurements and Instrumentation Laboratory	0	0	3	1.5	PC
8	25EPC309	DC Machines and Transformers Laboratory	0	0	3	1.5	PC
9	25EPC310	Analog Electronics Laboratory	0	0	3	1.5	PC
10	25EPC311	Technical Seminar	0	0	2	1	PC
Total			16	2	11	22.5	

SEMESTER IV

S.No	Subject Code	Subject Name	L	T	P	C	Category
1	25EBS401	Numerical Methods	3	1	0	4	BS
2	25EPC402	Linear Systems and Signals	3	1	0	4	PC
3	25EPC403	Synchronous and Asynchronous Machines	3	1	0	4	PC
4	25EPC404	Transmission and Distribution	3	1	0	4	PC
5	25EPC405	Linear Integrated Circuits and Applications	3	0	0	3	PC
6	25ZBS406	Environmental Sciences and Sustainability	2	0	0	2	BS
7	25EPC407	Synchronous and Asynchronous Machines Laboratory	0	0	3	1.5	PC
8	25EPC408	Linear and Digital Integrated Circuits and Applications Laboratory	0	0	3	1.5	PC
9	25ZHS409	Soft Skills and Personality Development Laboratory	0	0	3	1.5	HS
Total			17	4	9	25.5	

SEMESTER V

S.No	Subject Code	Subject Name	L	T	P	C	Category
1	25EPC501	Control Systems Engineering	3	1	0	4	PC
2	25EPC502	Power System Analysis	3	0	0	3	PC
3	25EPC503	Power Electronics	3	1	0	4	PC
4		Professional Elective-I	3	0	0	3	PE
5		Professional Elective-II	3	0	0	3	PE
6		Open Elective-I	3	0	0	3	OE
7	25EPC507	Control Systems Laboratory	0	0	3	1.5	PC
8	25EPC508	Power Electronics Laboratory	0	0	3	1.5	PC
9	25EPC509	Power System Laboratory	0	0	3	1.5	PC
Total			18	2	9	24.5	

SEMESTER VI

S.No	Subject Code	Subject Name	L	T	P	C	Category
1	25EPC601	Power System Protection and Switchgear	3	1	0	4	PC
2	25EPC602	Microprocessor and Embedded controllers	3	1	0	4	PC
3	25EHS603	Principles of Management	2	0	0	2	HS
4		Professional Elective-III	3	0	0	3	PE
5		Professional Elective-IV	3	0	0	3	PE
6		Open Elective –II	3	0	0	3	OE
7	25EPC607	Power System Protection and Switchgear Laboratory	0	0	3	1.5	PC
8	25EPC608	Microprocessor and Embedded controllers Laboratory	0	0	3	1.5	PC
9	25EPC609	Design Project Laboratory	0	0	2	1	PC
10	25ZHS610	Club Activity	0	0	2	1	HS
Total			17	2	10	24	

SEMESTER VII

S.No	Subject Code	Subject Name	L	T	P	C	Category
1	25ZHS701	Human Values and Professional Ethics	2	0	0	2	HS
2	25EPC702	Electrical Drives and Control	3	1	0	4	PC
3		Professional Elective-V	3	0	0	3	PE
4		Professional Elective-VI	3	0	0	3	PE
5		Open Elective - III	3	0	0	3	OE
6		Open Elective-IV	3	0	0	3	OE
7	25EPC707	Comprehensive Viva-Voce	0	0	2	1	PC
8	25EPC708	Internship	4 Week	-	-	1	PC
9	25EPC709	Industry Lecture	0	0	0	1	PC
10	25EPR710	Project - I	0	0	6	4	PR
Total			17	1	8	25	

SEMESTER VIII

S.No	Subject Code	Subject Name	L	T	P	C	Category
1	25EPR801	Project–II /Internship	0	0	16	8	PR
Total			0	0	16	8	

Total Credit of the Programme: 171

Professional Electives (PE)

Students must choose 6 Professional Electives

Based on the industrial needs and latest developments in the engineering subjects may be proposed. Numbers not limited to 16						
1	25EPEV101	High Voltage Engineering	3	0	0	3
2	25EPEV102	HVDC & EHAC Transmission System	3	0	0	3
3	25EPEV103	Flexible AC Transmission Systems	3	0	0	3
4	25EPEV104	Power Quality	3	0	0	3
5	25EPEV105	Power System operation and control	3	0	0	3
6	25EPEV106	Smart Grid	3	0	0	3
7	25EPEV201	Advanced Power Semiconductor Devices	3	0	0	3
8	25EPEV202	Solid State Drives	3	0	0	3
9	25EPEV203	Advanced Electric Drives	3	0	0	3
10	25EPEV204	Power Electronics for Renewable Energy Systems	3	0	0	3
11	25EPEV205	Computer Aided Design of Electrical Apparatus	3	0	0	3
12	25EPEV206	Special Electrical Machines and Design	3	0	0	3
13	25EPEV301	Embedded System Design	3	0	0	3
14	25EPEV302	Digital Signal Processing	3	0	0	3
15	25EPEV303	Advanced Control Theory	3	0	0	3
16	25EPEV304	Logic and distributed Control Systems	3	0	0	3
17	25EPEV305	Real Time Interfacing and Processing for Power Electronics Application	3	0	0	3
18	25EPEV306	Digital Control	3	0	0	3

19	25EPEV401	Electric Vehicle Architecture	3	0	0	3
20	25EPEV402	Hybrid Electric and Fuel Cell Vehicles	3	0	0	3
21	25EPEV403	Electric Vehicle charging and Testing	3	0	0	3
22	25EPEV404	Energy Storage for EVs	3	0	0	3
23	25EPEV405	Grid Integration of Electric Vehicles	3	0	0	3
24	25EPEV406	Intelligent Control of Electrical Vehicles	3	0	0	3
25	25EPEV501	Applied Soft Computing	3	0	0	3
26	25EPEV502	Neural and Fuzzy Systems	3	0	0	3
27	25EPEV503	Automotive Electronics for Electrical Engineering	3	0	0	3
28	25EPEV504	Electrical components and system design	3	0	0	3
29	25EPEV505	AI for Electrical Engineers	3	0	0	3
30	25EPEV506	Industrial Electrical Systems	3	0	0	3

Open Electives (OE)

Students must choose 4 Open Electives from other departments (3 credits each = 12 credits)

To provide interdisciplinary engineering knowledge, subjects may be proposed. Numbers not limited to 5						
1	25EOE001	MATLAB Programming	3	0	0	3
2	25EOE002	Solar and Wind Energy Systems	3	0	0	3
3	25EOE003	Energy Management and Auditing	3	0	0	3
4	25EOE004	Reliability Engineering	3	0	0	3
5	25EOE005	Electric Vehicles	3	0	0	3
6	25EOE006	Electrical Engineering	3	0	0	3
7	25EOE007	Generation, Transmission and Distribution	3	0	0	3
8	25EOE008	Power Electronics and Drives	3	0	0	3
9	25EOE009	Electrical Drives and Control	3	0	0	3
10	25EOE010	Home Automation	3	0	0	3

11	25EOE011	Network Theory	3	0	0	3
12	25EOE012	Smart Power System	3	0	0	3
13	25EOE013	PLC and SCADA	3	0	0	3
14	25EOE014	Sensors and Control	3	0	0	3

VERTICALS

Vertical 1 **Power Engineering**	**Vertical 2** **Converters and Drives**	**Vertical 3** **Embedded System and Control**	**Vertical 4** **Electric Vehicle Technology**	**Vertical 5** **(Diversified Courses)**
25EPEV101-High Voltage Engineering	25EPEV201-Advanced Power Semiconductor Devices	25EPEV301-Embedded System Design	25EPEV401-Electric Vehicle Architecture	25EPEV501-Applied Soft Computing
25EPEV102-HVDC & EHAC Transmission System	25EPEV202-Solid State Drives	25EPEV302-Digital Signal Processing	25EPEV402-Hybrid Electric and Fuel Cell Vehicles	25EPEV502-Neural and Fuzzy Systems
25EPEV103-Flexible AC Transmission Systems	25EPEV203-Advanced Electric Drives	25EPEV303-Advanced Control Theory	25EPEV403-Electric Vehicle charging and Testing	25EPEV503-Automotive Electronics for Electrical Engineering
25EPEV104-Power Quality	25EPEV204-Power Electronics for Renewable Energy Systems	25EPEV304-Logic and distributed Control Systems	25EPEV404-Energy Storage for EVs	25EPEV504-Electrical components and system design
25EPEV105-Power System operation and control	25EPEV205-Computer Aided Design of Electrical Apparatus	25EPEV305-Real Time Interfacing and Processing for Power Electronics Application	25EPEV405-Grid Integration of Electric Vehicles	25EPEV505-AI for Electrical Engineers
25EPEV106-Smart Grid	25EPEV206-Special Electrical Machines and Design	25EPEV306-Digital Control	25EPEV406-Intelligent Control of Electrical Vehicles	25EPEV506-Industrial Electrical Systems

Department Specific Requirement

Sl. No	Course Code	COURSE TITLE	CAT	Credit
1	25EPC609	Idea / Proof of Concept /design thinking (Students shall identify real-world problems and propose innovative solutions or prototypes through design thinking.)	PC	1
2	25EPC708	Internship (Minimum 4 weeks) (Students must undergo a minimum of four weeks of industrial/research internship and submit a certified report for evaluation.)	PC	1
3	25EPC311	Technical Seminar / Publications / Participation in Conferences (Each student must present a seminar or publish/participate in a conference to develop communication and research skills.)	PC	1
4	25EPC709	Industry Lecture (Students must attend at least two expert lectures either organized by Institute or third party and submit a summary report to gain industrial exposure.)	PC	1
5	25ZHS610	Technical Club activity / participation in Sports / Cultural Club activity / NSS (Active participation in technical, cultural, sports, or NSS activities are mandatory to promote holistic and team-based learning.)	HS	1

Institute Requirement

Sl. No	Course Code	COURSE TITLE	CAT	Credit
1		Induction Program (All first-year students must attend the induction program to understand institute culture, ethics, and learning practices.)	HS	0
2		Participation in Hackathon (Students must participate in at least one hackathon to encourage innovation, teamwork, and problem-solving aptitude.)	HS	0

Note:

- Department-Specific Requirement (DSR) courses shall be completed between the 3rd and 6th semesters.

- All listed activities are mandatory components of the curriculum and must be completed before graduation.
- Students must maintain records such as attendance, reports, or participation certificates for verification.
- Department coordinators will verify and forward activity completion reports to the Head of the Department.
- Credits for each activity will be awarded only after successful completion and submission of required documents.
- Non-completion of any activity within the scheduled semester must be compensated in the subsequent semester.
- Evidence of participation and performance will be maintained in the department portfolio and subject to audit.
- The consolidated list of students completing these requirements will be forwarded to the Controller of Examinations for grade entry.

Signature of HOD

Detailed Syllabi

Semester-I

Subject Code	25ZHS101	**Subject Title**	English for Engineers-I
Category	HSMC	**L-T-P-C**	3-0-0-3
Regulation	2025	**Semester**	I

Prerequisites Common vocabulary and ability to frame simple sentences in English

Course Objectives:

1. To improve the communicative competence of learners.
2. To help learners use language effectively in academic / work contexts.
3. To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.
4. To develop learners' ability to read and write complex texts, summaries, blogs, definitions, essays and user manuals.
5. To use language efficiently in expressing their opinions via various media.

Course Content:

[VOCABULARY] (9 Hours)

Technical Vocabulary – Formal and Informal Vocabulary – Avoidance of Jargon -Verbal Analogies One Word Substitution – Tenses- Linking Words – Fixed and Semi-Fixed Expressions.

[LANGUAGE] (9 Hours)

Numerical Adjectives - Embedded Sentences - Subject-Verb Agreement - If Conditionals - Active Voice and Passive Voice – Phrasal Verbs – Misplaced Modifiers – Discourse Markers – Question Tag

[LISTENING AND SPEAKING] (9 Hours)

Listening to TED/ POD Talks – Self introduction- Formal and Informal Conversation Greeting People - Asking for and giving directions - Asking for and Offering Help – Seeking Clarification – Speaking about a Process- JAM (short presentation)

[READING] (9 Hours)

Skimming and Scanning – Accent Variations - Pronunciation - Reading for Detailed Comprehension - Reading and Understanding Technical Articles – Reading Advertisements.- Gadgets reviews; user manuals.

[WRITING] (9 Hours)

Writing Instructions, Recommendations and Warnings - Interpreting Charts and Graphs - Describing a Process - Extended Definitions - Report Writing - Minutes of Meeting – Jumbled Sentences.

Total Hours: 45

CO	COURSE OUTCOMES	Bloom's Level
CO1	Listen and comprehend complex academic texts.	L1
CO2	Read and infer the denotative and connotative meanings of technical texts.	L2
CO3	Write definitions, descriptions, narrations and essays on various topics.	L4
CO4	Speak fluently and accurately in formal and informal communicative contexts.	L3
CO5	Express one's opinions, interpreting data and analysis of a technical text with a good command of English.	L6

Upon successful completion of this course, students will be able to:

TEXT BOOKS:

1. D Praveen Sam KN Shoba ,"A Course in Technical English", Cambridge University Press. 2020.

REFERENCES BOOKS:

1. *Markel, Mike. "Technical Communication" New York: Bedford.2007.*
2. *"Communication Skills in English" Edited by The department Of English, Osmania University, Hyderabad, Oxford University Press.1998.*
3. *Laplante, A. Phlip. "Technical Writing: A Practical guide for Engineers, Scientists and Nano Technical Professionals" CRC Press.2019.*
4. *Gerson, Sharon & Steven Gerson. "Technical Communication: Process and Product". Pearson. 2019.*

Course Articulation matrix:

CO	Program Outcomes										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
CO1	-	-	-	-	-	-	-	-	-	3	-
CO2	-	-	-	-	-	-	-	-	-	3	-
CO3	-	-	-	-	-	-	-	-	-	3	-
CO4	-	-	-	-	-	-	-	-	-	3	-
CO5	-	-	-	**2**	-	-	-	-	-	3	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
Dr. A. Jesu Steephan Samy. AP/Eng.

BOS Approval
29.05.2025

Subject Code	25ZBS102	**Subject Title**	MATRICES AND CALCULUS
Category	BASIC SCIENCE	**L-P-T-C**	3-0-1-4
Regulation	2025	**Semester**	I
Prerequisites	Basic knowledge of algebra, trigonometry, and elementary calculus.		

Course Objectives:

1. Provide essential l matrix algebra tools used in engineering.
2. Strengthen understanding of single-variable differential calculus.
3. Introduce functions of several variables, important for advanced engineering problems.
4. Train students in integration techniques for various applications.
5. Familiarize students with multiple integrals and their applications in physical sciences and engineering.

Course Content:

[MATRICES](9+3)

Eigen values and Eigen vectors of a real matrix–Characteristic equation–Properties of Eigen values and Eigen vectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation –Reduction of a quadratic form to canonical form by orthogonal transformation–Nature of quadratic forms–Applications: Stretching of an elastic membrane.

[DIFFERENTIALCALCULUS](9+3)

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules(sum, product, quotient, chain rules)-Implicit differentiation-Logarithmic differentiation-Applications: Maxima and Minima of functions of one variable.

[FUNCTIONSOFSEVERALVARIABLES](9+3)

Partial differentiation–Homogeneous functions and Euler's theorem–Total derivative– Change of variables –Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

[INTEGRALCALCULUS](9+3)

Definite and Indefinite integrals – Substitution rule -Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions-Improper integrals-Applications: Hydrostatic force and pressure, moments and centers of mass.

[MULTIPLEINTEGRALS] (9+3)

Double integrals – Change of order of integration – Double integrals in polar coordinates–Area enclosed by plane curves–Triple integrals–Volume of solids– Change of variables in double and triple integrals–Applications: Moments and centers of mass, moment of inertia.

Total Hours: 60

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Apply matrix theory, including Eigen values and quadratic forms, to engineering and physical systems.	L4
CO2	Use differential calculus for analyzing functions and solving maxima- minima problems.	L3
CO3	Analyze and optimize functions of several variables using partial derivatives, Jacobians, and Lagrange multipliers.	L3
CO4	Solve integrals using various techniques and apply the minpractical engineering contexts.	L4
CO5	Evaluate and apply multiple integrals to compute physical quantities such as volume and moment of inertia.	L5

Text Books:

1. Kreyszig.E, "Advanced Engineering Mathematics" John Wiley and Sons, 10th Edition, New Delhi, 2016.

2. Grewal.B.S.,"Higher Engineering Mathematics", Khanna Publishers, NewDelhi,44th Edition,2018.

3.JamesStewart,"Calculus:EarlyTranscendental",CengageLearning,8th Edition,NewDelhi,2015.[For Units II & IV-Sections1.1,2.2,2.3,2.5,2.7(Tangents problems only),2.8, 3.1 to 3.6,3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem),5.5,7.1 - 7.4 and 7.8].

Reference Books:

1. Anton.H,Bivens.I and Davis.S,"Calculus",Wiley,10th Edition,2016.
2. Bali.N.Goyal.M. and Watkins., "Advanced Engineering Mathematics" ,Firewall Media(An imprint of Lakshmi Publications Pvt.,Ltd.,),New Delhi,7th Edition,2009.
3. Jain. R.K.and Iyengar.S.R.K.,"Advanced Engineering Mathematics",Narosa Publications, New Delhi,5th Edition, 2016.
4. Narayanan.S.andManicavachagomPillai.T.K.,"Calculus"VolumeIandII, S.Viswanathan Publishers Pvt. Ltd., Chennai,2009
5. Ramana.B.V.,"Higher Engineering Mathematics",McGraw Hill Education Pvt.Ltd, New Delhi, 2016.
6. Srimantha Pal and Bhunia.S.C, "Engineering Mathematics" Oxford University Press, 2015.
7. Thomas.G.B.,Hass.J, and Weir.M.D,"Thomas Calculus", 14th Edition, Pearson India, 2018.

.**Course Articulation matrix:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	3	2	-	-	-	-	1	-
CO2	3	3	2	3	2	-	-	-	-	1	-
CO3	3	3	2	3	2	-	-	-	-	1	-
CO4	3	3	2	3	1	-	-	-	-	1	-
CO5	3	3	2	3	1	-	-	-	-	1	-

Correlation Levels:3- Strong,2- Medium,1 -Low, - (dash)-No correlation

Course Designed By

BOS Approval

Date:

Subject Code	25EBS103	**Subject Title**	Physics For Electrical Engineers
Category	Basic Science	**L-P-T-C**	3-2-0-4
Regulation	2025	**Semester**	I
Prerequisites	Fundamental concepts of mechanics and basic mathematics (vectors, calculus). Basic electricity, magnetism, and properties of matter studied in higher secondary Physics.Familiarity with atomic structure, energy levels, and elementary chemistry of solids.		

Course Objectives:

1. To introduce the principles of mechanics and apply those to rotational systems, understanding energy transformations, motion parameters of physical systems.
2. To explain the behavior of conducting materials through classical and quantum theories, focusing on electron mobility, electrical and thermal conductivity, and the fundamental basis of solid-state conduction.
3. To explore the electrical properties of semiconducting materials, including intrinsic and extrinsic semiconductors, energy band structures, carrier concentrations, and methods for experimental determination of band gap energy.
4. To understand dielectric materials and their response to electric fields, including various polarization mechanisms, frequency dependence, and the use of dielectric materials in insulation technologies.
5. To impart knowledge on magnetic materials ,their classification,properties,and applications, including the concepts of magnetization,hysteresis,and the physical basis for data storage technologies.

COURSE CONTENT

MECHANICS (9-Hours)

Work done: work-energy theorem, kinetic energy and potential energy, conservative and non-conservative forces, power: instantaneous and average power, rotational motion – angular Displacement- angular velocity, rotation of rigid body: moment of inertia (MI)-parallel and perpendicularaxestheorem-rotationalenergystatesofdiatomicmolecules-torsionoscillations–MI of circular disc (theory and experiment).

CONDUCTING MATERIALS (9-Hours)

Classification of conducting materials, classical free electron theory–electrical conduction in metals-electrical and thermal conductivity-Wiedemann Franz law–Lorentz number ,success and failure, quantum theory: Fermi distribution function–effect of temperature–density of states(derivation)– Band theory of solids(qualitative).

SEMICONDUCTING MATERIALS (9-Hours)

Types of semiconductors-intrinsic semiconductor, energy band diagram-direct and indirect band gap semiconductor-intrinsic carrier concentration, electrical conductivity of intrinsic semiconductor ,extrinsic semiconductor– types– carrier concentration(n-type),experimental determination of band gap of semiconductor.

DIELECTRIC MATERIALS (9-Hours)

Dipole moment –permittivity – electric displacement - polarization -types –total polarization, frequency dependence, dielectric materials-Lorentz field-Clausius-Mossotti equation–dielectric loss, dielectric breakdown mechanism, applications: Insulators in electrical systems-capacitor, microwave and RF applications.

MAGNETIC MATERIALS 9

Magnetism in materials– magnetic moment-Bohrmagnet on-magnetic field and induction– magnetic flux density-magnetization–magnetic permeability–susceptibility, classification of

magnetic materials (dia,para,ferro),domain theory of ferromagnetism–hysteresis–soft and hard magnets, magnetic principles of data storage.

45-Periods

Experiments: **(30 Periods)**

1. Determination of moment of inertia of a circular disc by torsion oscillations.
2. Determination of electrical conductivity of given metal wire.
3. Determination of band gap of given semiconductor./
4. Determination of Boltzmann constant using semiconductor diode.
4. Determination of dielectric constant of ceramic material.
5. Determination of retentivity and coercive field of ferro magnetic material.

THEROY: 45PERIODS, PRACTICALS: 30 PERIODS, TOTAL:75 PERIODS

Upon successful completion of this course, students will be able to

CO	Course Outcome	Bloom's Level
CO1	Re call and explain the basic principles of mechanics and material science (Conducting, semiconducting, dielectric, magnetic).	L1
CO2	Understand and interpret laws/theories like work-energy theorem, free electron theory, band theory, and polarization mechanisms.	L2
CO3	Apply theoretical principles to solve problems and perform experiments on moment of inertia, electrical conductivity, band gap, dielectric constant, and magnetic properties.	L3
CO4	Analyze and compare properties of different materials for engineering applications such as sensors, insulators, and data storage.	L4
CO5	Conduct experiments, interpret data, and correlate theoretical and Experimental results with safety, teamwork, and communication.	L4

Text Books:

1. M. N. Avadhanulu and P. G.Kshirsagar, Engineering Physics, S. Chand Publications, Revised Edition,2019.

2. Arthur Beiser,Concepts of Modern Physics, McGraw Hill Education,7th Edition,2017.

3.David Halliday,Robert Resnick, and Jearl Walker, Fundamentals of Physics, Wiley India, 12th Edition,2021.

4.Raymond A.Serway and John W. Jewett, Physics for Scientists and Engineers, Cengage Learning,10th Edition,2018.

5.S.O. Pillai,Solid State Physics, New Age International Publishers, 8thEdition,2018.

Reference Books:

1.Charles Kittel,Introduction to Solid State Physics, Wiley,8th Edition,2005.

2. WilliamD.CallisterJr. and David G. Rethwisch, Materials Science and Engineering:An Introduction, Wiley, 10th Edition,2020.

3.RichardP. Feynman,Robert B.Leighton, and Matthew Sands,The Feynman Lectures on Physics,Addison-Wesley (now Perseus Books), Definitive Edition,2011.

4.Edward M.Purcell and David J.Morin, Electricity and Magnetism,Cambridge University Press,3rd Edition, 2013.

5. R. K.Gaur and S.L. Gupta, Engineering Physics,Dhanpat Rai Publications,Revised Edition,2017.

Course Articulation matrix:

CO	Program Outcomes(PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	1	-	-	-	-	-	-	1	-	-	-	-
CO2	3	3	2	-	1	-	-	-	-	1	-	-	-	-
CO3	3	3	2	3	1	-	1	-	-	1	-	-	-	-
CO4	3	3	3	2	1	1	1	-	-	1	-	-	-	-
CO5	2	2	2	3	3	1	1	2	3	3	2	-	-	-

Correlation Levels:3- Strong, 2-Medium,1 - Low,- (dash) - No correlation

Course Designed By:

Name & Designation:

1. Dr. R. Bakkiyaraj, Associate Professor&Head/Physics
2. Mr.A.Anandakumar, Assistant Professor/Physics
3. Dr.S.Santhosh, Assistant Professor/Physics

BOS Approval
Date: 30/05/2025

Course code	25ZBS104	Course Title	ENGINEERING CHEMISTRY
Category	Basic Science	L-P-T-C	3-2-0-4
Regulation	R-2025	Semester	01
Prerequisites	Nil		

Course Objectives:

1. Acquire knowledge in need for water treatment and their real time applications.
2. To understand the concept of electrochemical reactions and corrosion.
3. To equip students with basic knowledge of polymers and composite materials.
4. Understand the working principle involved in energy sources and storage devices.
5. Acquire hands-on experience with analytical instruments and learn how to analyze and interpret experimental data.

Course Content:

WATER TECHNOLOGY Theory: 9 hours; Practicals: 6 hours

Global and Indian water scenario – engineering applications of water – Characteristics – alkalinity and its significance – hardness (problems) - estimation by EDTA method – potable water treatment – boiler feed water - requirements – disadvantages of using hard water in boilers (Scales & Sludge, Boiler corrosion, Priming & Foaming, Caustic embrittlement) – water treatment – Internal treatment – external treatment – Ion exchange process – desalination – reverse osmosis method.

Practicals:

- Analysis of basic parameters of water(Colour, odour, pH, Conductance, TDS)
- Determination of alkalinity in the given water sample by titrimetric method.
- Determination of total hardness of given water sample by EDTA method.
- Demonstration of treatment of hard water by Ion exchange process.
- To study the effects of hard water on boilers by preparing small boiler provided with heating element and to observe the scale/sludge formation.

ELECTROCHEMISTRY AND CORROSION Theory: 9 hours; Practicals: 6 hours

Electrochemistry: Reversible and irreversible cells – EMF – single electrode potential – Nernst equation (Problems) – reference electrode – standard hydrogen electrode and calomel electrode – glass electrode and measurement of pH – electrochemical series and its applications.

Corrosion: Corrosion - dry corrosion and its mechanism - Pilling Bed worth rule - electrochemical corrosion and its mechanism – types (galvanic, pitting) – factors influencing corrosion – corrosion control methods – sacrificial anode method – impressed current method –protective coatings: paints – definition - constituents and its functions.

Practicals:

- To Determine the EMF of the cell by Poggendroff compensation method.
- Conduct metric titration: Strong acid (HCl) vs Strong base (NaOH).
- Measurement of pH using glass electrode (pH titration).
- Observe the type and rate of corrosion by comparing the effects of different solutions (tap water, salt water and acid) on different metal samples (Iron, Copper and Zinc).

POLYMERS AND COMPOSITES Theory: 9 hours; Practicals: 6 hours

Polymers: Classification – functionality – degree of polymerization – types (addition, condensation, co-polymerization) – free radical mechanism – thermoplastics and thermosetting plastics – preparation, properties and uses of individual polymers (PVC, TEFLON, epoxy resin) – Conducting polymers - Properties and its applications (Polyacetylene) – Insulators – types – engineering applications.

Composites: definition – types polymer matrix composites – Fibre Reinforced Polymers – applications.

Practicals:

- Determination of molecular weight of polymer using Ostwald viscometer.
- Identification of Thermoplastics and Thermosetting plastics.
- To study the difference between conductor and insulator with various materials. To observe

  (i) how materials with different electrical properties affect the flow of current and

  (ii) how insulation affects rate of heat transfer.
- Fabricate a simple composite panel using layers of fabric (like fiberglass) and resin. Measure the tensile strength of composite. Compare the properties of composites made with different types of resins.

ENERGY SOURCES AND STORAGE DEVICES Theory: 9 hours;Prac.:6 hours

Introduction – classification of energy sources - global and Indian energy scenario - Solar energy and wind energy – working principle and applications – light water nuclear reactor for power generation. Batteries: primary and secondary batteries – Lead–acid battery, Li-ion and Li-Iron phosphate batteries – Fuel cell: Alkaline (H_2 – O_2) fuel cell, polymer electrolyte fuel cell– principles and applications – advantages and disadvantages – Super capacitor – Definition – Difference between Super capacitor and Battery – merits and demerits of super capacitor.

Practicals:

- Build a simple battery with household items. Explore how different materials and conditions affect battery performance.
- To Study the safety storage and disposal of batteries.
- Measurement of voltage in a photovoltaic cell.
- Identification of components in dry/alkaline cell and Lead-acid battery.
- To learn the real-life examples of super capacitor.

ANALYTICAL TECHNIQUES Theory: 9 hours; Prac.: 6 hours

Spectroscopy: Electromagnetic spectrum - Fundamentals of spectroscopy – Beer Lambert's law (problems) – Instrumentation, working principle and applications of UV-Visible spectrophotometer, Atomic Absorbance Spectrophotometer (AAS), Flame photometer. Chromatography: Introduction – Instrumentation, working principle and applications of Paper chromatography, Gas liquid Chromatography and HPLC.

Practicals:

- Estimation of iron content of the given sample using UV-Visible Spectro photometer.

- Estimation of sodium present in water sample using flame photometer.
- To study the components, present in given sample using GCMS.

Theory: 45 Periods; Practicals: 30 Periods TOTAL : 75 PERIODS

Upon successful completion of this course, student will be able to,

CO	Course Outcome	Bloom's Level
CO1	Apply the knowledge of basic science in identifying, to formulate and to solve the engineering problems. Directly contributes to **Sustainable Development Goals 6: Clean Water and Sanitation**.	L3
CO2	Understand the role of electrochemistry in various applications like energy storage and corrosion prevention.	L2
CO3	Apply knowledge and skills to design, analyze, and utilize polymers and composites in various engineering disciplines.	L4
CO4	Develop skills in analyzing battery performance, designing new battery materials and apply to renewable energy systems.	L5
CO5	Understand and apply appropriate spectroscopic techniques to solve engineering problems.	L6

Text Books:

1. P. C. Jain and Monica Jain, "Engineering Chemistry" 17th edition, Dhanpat Rai Publishing Co., 2023.
2. Sivasankar B., "Engineering Chemistry", 3rd Edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2015.

Reference Books:

1. ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", 2ndEdition, Cambridge University Press, Delhi, 2019.
2. Douglas A Skoog, Donald M, West "Fundamentals of Analytical Chemistry", 10th edition, Cengage, 2022.
3. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, 2nd Edition,Springer Science Business Media, New York, 2013.
4. O.G. Palanna, "Engineering Chemistry" 2nd Edition, McGraw Hill Education (India) Private Limited, 2017.

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	-	-	-	2	3	2	-	-	-
CO2	3	2	1	-	-		3	2	-	-	-
CO3	3	2	-	-	-	2	3	2	-	-	-
CO4	3	2	-	-	-	2	3	2	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-

Correlation Levels:3 – Strong, 2 – Medium, 1 – Low and (-) No correlation

Course Designed by
(1) Dr.G.SARASWATHY,
ASP & Head/Chemistry.
(2) Dr.S.ELUMALAI, AP/Chemistry.

BoS Approval
Date: 29.05.2025.

Subject Code	25EES105	**Subject Title**	**C Programming With Applications**
Category	ES	**L-P-T-C**	3-0-0-3
Regulation	2025	**Semester**	I

Prerequisites Basic programming knowledge

Course Objectives:

1. To provide the knowledge of C Programming in context of writing efficient programs.
2. To apply C Programming for basic science and engineering calculations
3. To develop analytical and problem-solving skills in C Programming
4. To understand the importance of structures and pointer.

Course Content:

Course Content:

Basics of C Programming (9 Hours)

Introduction to C – Structure of a C program – Compilation and Linking Processes - Identifiers and Keywords - Basic Data Types - Variables and Constants - Input and Output Functions - Operators and Expressions - Type Conversion and Typecasting - Control Statements – Pre-processor Directives. Solution to simple mathematical, logical problems.

Arrays and Strings (9 Hours)

Declaration and initialization - 1D/2D arrays - Array operations – Sorting- Strings - Reading and Writing Strings - Operations on Strings(length, compare, concatenate, copy) - Solution to simple mathematical (Matrix operation), logical and aptitude problems.

Functions and Pointers (9 Hours)

Functions – Built-in Functions – User-Defined Functions – Recursive Function - Pointers - Declaring Pointer Variables – Null Pointer – Generic Pointer – Call by Reference - pointer arithmetic - Parameter passing - Arrays and pointers - Array of pointers- function pointers - Applications: Solution to system of linear equations, creating functions for given mathematical equations.

Structures, Unions Dynamic Memory (9 Hours)

Storage Classes - Structure - Nested Structures - Arrays of Structures- Self-referential structures - Pointers with structures – Unions- Dynamic memory allocation –malloc – alloc – realloc - free - Applications: Sum of series using modular programming.

Application to Solving Equations (9 Hours)

Solution to determine roots of f(x) using Newton Raphson methods - Numerical Integration using Trapezoidal Rule – Numerical Differentiation - Solution to Simultaneous Equations through Gauss-Jordan and Gauss Seidel Methods - Solution to differential equations (initial value problems) using Euler's method and 2nd order Runge-Kutta Method

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Understand and explain the basic concepts of C Programming	L2
CO2	Develop a C program to control the sequence of the program and give logical outputs.	L3
CO3	Implement Array, String concepts in C Program and develop C programming for solving simple scientific and engineering calculations	L4
CO4	Implement C program using functions, Structures and Union and develop C programming to Solve system of linear equations, creating functions for given mathematical equations.	L5
CO5	Apply pointers concepts and code re usability with Lists.	L3

TEXTBOOKS:

1. E. Balagurusamy, "Programming in ANSI C", Mc Graw Hill, 9th Edition, 2024.
2. Yashavant Kanetkar, "Let Us C", BPB Publications, 20th Edition, 2024.
3. Reema Thareja, "Data Structures Using C", Oxford University Press, 3rd Edition, 2025.

REFERENCES:

1. B.W. Kernighan and D.M. Ritchie, "The C Programming Language", Prentice Hall, 2nd Edition, 1988.
2. Greg Perry & Dean Miller, "C Programming Absolute Beginner's Guide", Que Publishing, 3rd Edition, 2013.
3. Stephen G. Kochan, "Programming in C", Addison-Wesley, 3rd Edition, 2004.
4. Herbert Schildt, "C: The Complete Reference", McGraw Hill, 4th Edition, 2000.

COURSE ARTICULATION MATRIX:															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	2	3	3	1	-	-	-	-	-	-	-	3	2	1
CO2	3	2	3	3	1		-	-	-	-	-	-	3	2	1
CO3	3	2	3	3	1		-	-	-	-	-	-	3	2	1
CO4	3	2	3	3	1	-	-	-	-	-	1		3	1	-
CO5	3	2	3	3	1	-	-	-	-	-	1		3	1	-
1-Low, 2- Moderate, 3-High															

Course Designed By

Dr.I.Thangaraju,AP/EEE

BOS Approval

Date: 22.05.2025

:

தமிழர் மரபு

அலகு I மொழி மற்றும் இலக்கியம்: 3

இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கூறுத்துக்கள் – தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை: 3

நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள்– பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறத் தெய்வங்கள் – குமரிமுனையில் திருவள்ளுவர் சிலை – இசைக் கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்: 3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்: 3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால நகரங்களும் துறை முகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: 3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)

4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

25ZMC107.

HERITAGE OF TAMILS

L T P C
1 0 0 1

UNIT I LANGUAGE AND LITERATURE 3

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS 3

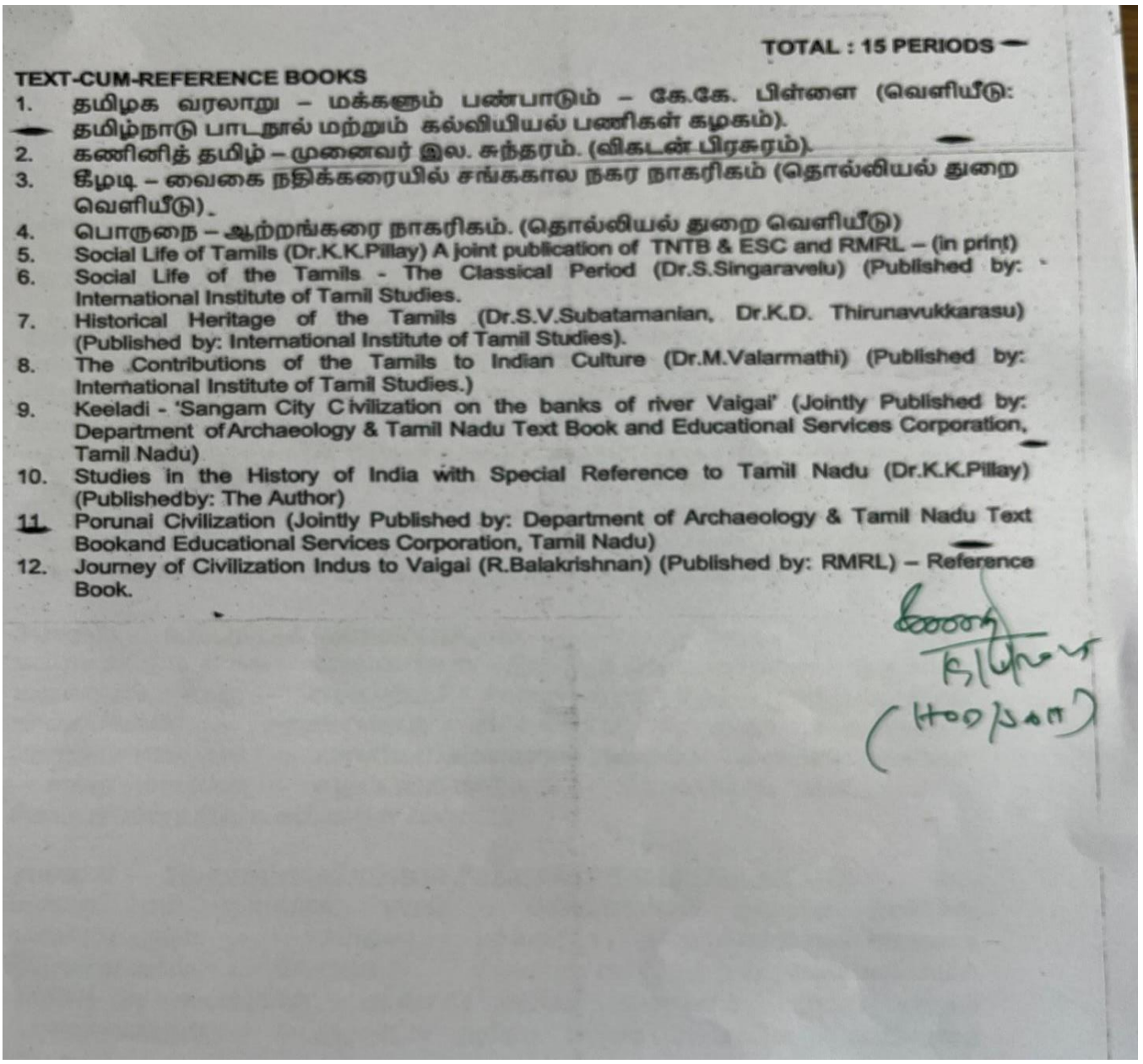
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS 3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.



TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

Subject Code	25EES108	**Subject Title**	**C Programming with applications Laboratory**
Category	ES	**L-T-P-C**	**0-0-3-1.5**
Regulation	2025	**Semester**	I

Prerequisites Basic programming knowledge.

Course Objectives:

1. To design solutions to simple engineering problem by applying the basic programming principles of C language.
2. To develop simple C programs to illustrate the applications of different data types such as arrays, pointers, functions.
3. To develop the Data Structure concept like linked list, Stack and Queue operations.

Course Content:

C Programs:

1. Find the largest among the given numbers. Reverse the given number.
2. Arrange the given numbers in an ascending order using different Sorting techniques.
3. Perform Matrix addition and multiplication using 2D/3D array.
4. Programs involving Call by Value and Call by References.
5. Evaluation of mathematical series.
6. Solution to simultaneous equations.
7. Creating a function for a given mathematical expression and call the function through function pointer.
8. Solution to logical and aptitude problems
9. Programs involving concept of array of structures.
10. Perform computation involving dynamic memory allocation.
11. Solution to a given function using newton Raphson method
12. Solution to a given system of equations using gauss Jordan / gauss seidel methods
13. Evaluation of a given definite integral using trapezoidal method
14. Solution to a given differential equation or a system of differential equations using Euler's/Runge-kutta 2^{nd} order method

Total Hours: 45

COURSE ARTICULATION MATRIX:														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	3	2	1	1	-	-	-	-	-	-	1	3	3	-
CO2	3	2	2	1	-	-	-	-	-	-	1	3	3	-
CO3	3	2	2	1	-	-	-	-	-	-	2	2	1	-
CO4	3	2	2	2	-	-	-	-	-	-	2	2	1	-
CO5	3	2	2	2	-	-	-	-	-	-	2	3	1	-
(L- Low, M- Moderate, H-High)														

REFERENCES:	
1.	E Balagurusamy, “PROGRAMMING IN ANSI C”, 8th edition, Mc Graw Hill, 2019.
2.	Ajit S. Mali (Author), Amol M. Jagtap, “Data Structures using C: A Practical Approach for Beginners”, 1 stedition, CRC Press, 2021.
3.	Mark Allen Weiss “Data structures and Algorithm Analysis in C”, – 1 January 2020

CO	COURSE OUTCOMES	Bloom’s Level
CO1	Apply good programming design methods for program development.	L1
CO2	Write C programs, which involve decision making and arrays and strings.	L2
CO3	Develop programs using functions and pointers.	L4
CO4	Develop programs using structures and unions.	L3
CO5	Write programs that use arrays, linked structures, stacks, queues, trees, and graphs.	L6

Course Designed By

Dr.I.Thangaraju,AP/EEE

BOS Approval

Date: 22.05.2025

Subject Code	25ZHS109	**Subject Title**	**Communication English Laboratory**
Category	HS	**L-T-P-C**	**0-0-2-1**
Regulation	2025	**Semester**	I

Prerequisites Basic English conversation and varieties in English language.

Course Objectives:

1. To make students recognize the sounds of English through Audio-Visual aids.
2. To help students build their confidence and help them to overcome their inhibitions and self-consciousness while speaking in English.
3. To familiarize the students with stress and intonation and enable them to speak English effectively.
4. To give learners exposure to and practice in speaking in both formal and informal contexts.
5. To enhance their communicative competency in English with specific reference to creative thinking and leadership skills

Course Content:

Introduction to Phonetics (6 Hours)

The Sounds of English (Speech sound -vowels and consonants) - Stress and Intonation - Accent and Rhythm**.**

Listening Skills (6 Hours)

Listening for gist and specific information- listening for Note taking, summarizing and for opinions - Listening to the speeches of eminent personalities.

Speaking Skills (6 Hours)

Self-introduction -Conversation Skills (Introducing and taking leave) - Giving and asking for information - Role Play - Just A Minute (JAM) session - Telephone etiquette.

Reading and Writing Skills (6 Hours)

Reading Comprehension-Précis Writing - E-Mail writing – Punctuation.

Presentation Skills (6 Hours)

Verbal and non-verbal communication -Body Language - Making a Presentation.

Total Hours: 30

CO	COURSE OUTCOMES	Bloom's Level
CO1	Sensitize and recognize different English sounds and intonation.	L1
CO2	Study the communicative items in the laboratory will help students become successful in the competitive world.	L2
CO3	Participate in group activities like role plays, group discussions and debates.	L4
CO4	Express themselves fluently and accurately in social as well as professional context.	L3
CO5	Come out with leadership qualities, capable of working in a team with the advantageous employability skills.	L6

Upon successful completion of this course, students will be able to:

Text Books:

1. "Communication Skills for Engineers and Scientists", PHI Learning PVT.LTD, Delhi, 2014.
2. Dorling Kindersley, "Communication Skills and Soft Skills an Integrated Approach", (INDIA) PVT.LTD, New Delhi, 2012.
3. "Soft Skills", MJP Publishers, Chennai, 2010.

References Books:

1. Ashraf Rizvi," Effective Technical Communication", Tata McGraw Hill Education Private Limited, New Delhi.
2. "Speak Well" Orient Blackswan Publishers, Hyderabad.
3. Allan Pease, "Body Language" Manjul Publishing House, New Delhi.

Course Articulation Matrix:

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

CO	Program Outcomes										
	1	2	3	4	5	6	7	8	9	10	11
CO1	-	-	-	-	-	-	-	-	-	3	-
CO2	-	-	-	-	-	-	-	-	-	3	-
CO3	-	-	-	-	-	-	-	-	-	3	-
CO4	-	-	-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	-	-	-	-	3	-

Course Designed By **BOS Approval**

Dr. A. JesuSteephanSamy. AP/Eng. 29.05.2025

Semester-II

Subject Code	25ZHS201	**Subject Title**	English for Engineers-II
Category	HS	**L-T-P-C**	3-0-0-3
Regulation	2025	**Semester**	II
Prerequisites	Specific technical vocabulary and familiarity with document structures like reports, manuals, proposals and reviews.		

Course Objectives:

1. To engage learners in meaningful language activities to improve their LSRW skills.
2. To enhance learners' awareness of general rules of writing for specific audiences.
3. To help learners understand the purpose, audience, contexts of different types of writing.
4. To develop analytical thinking skills for problem solving in communicative contexts.
5. To demonstrate an understanding of job applications and interviews for internship and placements.

Course Content:

[BASICS OF LANGUAGE] (9 Hours)

Infinitives - Plain Infinitive – Participles – Gerund – Difference in British and American English – Engineering Terminology – Impersonal Passive Voice – Prepositional Phrases – Idioms and Phrases

[WIRTING DESCRIPTIONS] (9 Hours)

Errors Analysis - Airline/Train Announcement – Weather Forecast Report – Product Description – Advertisement Preparation – Writing Responses to Complaints – Enquiring about a course over phone.

[ORAL COMMUNICATION] (9 Hours)

Intonation – Oral Presentation – Extempore speech- Difference between Lecture and Public Speech - Role Play (Interview/ Telephone Interview)

[TECHNICAL WRITING] (9 Hours)

Technical Essay writing –Case study-- Letter Writing (Formal and Informal) – Job / Internship Application – Resume preparation- Compare and Contrast essay.

[NARRATION AND SUMMATION] (9 Hours)

Writing Vision and Mission Statement - Short Report on an Event (Field Trip, Internship Report etc.) – Writing Articles in Technical Blogs – Letter to Editor –Writing Proposals – Film/Book Reviews.

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	COURSE OUTCOMES	Bloom's Level
CO1	Sketch various Technical texts and present trailblazing ideas comprehensively.	L1
CO2	Explain the cause and effects of events and industrial processes through technical writing.	L2
CO3	Analyse problems in order to arrive at feasible solutions and communicate them orally and in the written format.	L4
CO4	Evaluate the events and the processes of technical traits, features and express the solutions.	L5
CO5	Write a proposal in a planned and logical manner, and draft effective reports.	L6

TEXT BOOKS:

1.ArunaKoneru, "English Language Skills for Engineers", McGraw Hill Education (India) Private Ltd 2020.

REFERENCES BOOKS:

1. *Bailey, Stephen. Academic Writing: "A Practical guide for students"New York: Rutledge, 2018. Pearson. 2019.*
2. *Sudarshana, N.P. and Savitha, C, "English for Engineers" Cambridge University Press, 2018.*
3. *Zinsser, William "On Writing Well" Harper Resource Book, 2001.*
4. *Hamp-Lyons, L "Study writing" Cambridge University Press, 2006.*

Course Articulation matrix:

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

CO	Program Outcomes										
	1	2	3	4	5	6	7	8	9	10	11
CO1	-	-	-	-	-	-	-	-	-	3	-
CO2	-	-	-	-	-	-	-	-	-	3	-
CO3	-	-	-	-	-	-	-	-	-	3	-
CO4	-	-	-	-	-	-	-	-	-	3	-
CO5	-	-	-	2	-	-	-	-	-	3	-

Course Designed By
Dr. A. JesuSteephanSamy. AP/Eng.

BOS Approval
29.05.2025

Subject Code	**25EBS202**	**Subject Title**	**VECTOR , TRANSFORMS AND DIFFERENTIAL EQUATIONS**
Category	Basic Science	**L-P-T-C**	3-0-1-4
Regulation	2025	**Semester**	II
Prerequisites	Fundamentals of calculus, differential equations, and basic vector algebra.		

Course Objectives:

1. **Understand and apply vector calculus concepts** such as gradient, divergence, curl, and vector integrals in physical and engineering contexts.
2. **Develop proficiency in Laplace transforms** and their use in solving linear differential equations and analyzing transient electrical circuits.
3. **Formulate and solve partial differential equations** relevant to engineering problems including wave propagation and voltage distribution.
4. **Analyze periodic functions using Fourier series** and apply harmonic analysis to electrical signals.
5. **Apply Fourier transform techniques** for signal analysis and solving engineering problems involving pulses and waveforms.

Course Content:

[VECTOR CALCULUS] (9+3 Hours)

Review of vector analysis – dot – Cross product – Geometrical and Physical interpretation - Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration –Gauss divergence theorem and Stokes' theorem (excluding proofs) – Simple applications involving cubes and rectangular parallel opipeds. Application: **Electric Field due to point charge, infinite line charge, magnetic field due to infinite line.**

[LAPLACE TRANSFORMS] (9+3 Hours)

Laplace transform –Basic properties –Derivatives and integrals of transforms – Transform of periodic functions. Inverse Laplace transform -Statement of Convolution theorem – Solution of linear ODE of second order with constant coefficients using Laplace transformation. Application: **Transient Analysis of an RC, RL. RLC Circuit.**

[DIFFERENTIAL EQUATIONS] (9+3 Hours)

ORDINARY DIFFERENTIAL EQUATIONS

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations.

PARTIAL DIFFERENTIAL EQUATIONS

Formation of partial differential equations – Singular integrals -- Solutions of standard types of first order partial differential equations - Lagrange's linear equation. Application: **Modeling Voltage Distribution Along a long Transmission Line, wave equation in Electromagnetic theory.**

[FOURIER SERIES] (9+3 Hours)

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier series – Parseval's identity – Harmonic analysis. Application: **Harmonic Analysis of a Square Wave Voltage in Power Electronics.**

[FOURIER TRANSFORMS] (9+3 Hours)

Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity. Application**: Analysis of a Rectangular Pulse.**

Total Hours: 60

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level

CO1	Apply vector calculus operations to solve problems in electromagnetic and related fields.	L3
CO2	Use Laplace transforms to solve ordinary differential equations and analyze transient behaviors in electrical circuits.	L3
CO3	Formulate and solve partial differential equations encountered in engineering applications.	L4
CO4	Develop Fourier series representations of periodic signals and perform harmonic analysis.	L4
CO5	Utilize Fourier transform methods for signal analysis and interpretation of engineering wave forms.	L4

Text Books:

1. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", Laxmi Publications Pvt Ltd, 9th Edition 2016.
2. Grewal.B.S.,"Higher Engineering Mathematics", Khanna Publishers, New Delhi,44thEdition ,2018.
3. William H. Hayt, Jr., John A. Buck**, Engineering Electromagnetics***9th Edition, 2019*

Reference Books:

1. Dass, H.K., and Er. RajnishVerma, "Higher Engineering Mathematics", S. Chand Private Ltd., 2014.
2. Glyn James, "Advanced Modern Engineering Mathematics", 5th Edition, Pearson Education, 2018.
3. Peter V. O'Neil, "Advanced Engineering Mathematics"**,** 7th Edition, Cengage learning, 2012.
4. Ramana.B.V.,"Higher Engineering Mathematics",McGraw Hill EducationPvt.Ltd,New Delhi,2017
5. Sivarama Krishna Das P. and Rukmangadachari E., "Engineering Mathematics", Volume II, Second Edition, PEARSON Publishing, 2018.

Course Articulation matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	2	1	-	-	-	-	1	-
CO2	3	3	2	3	2	-	-	-	-	1	-
CO3	3	3	2	3	2	-	-	-	-	1	-
CO4	3	3	2	3	2	-	-	-	-	1	-
CO5	3	3	2	3	2	-	-	-	-	1	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By **Date:**

BOS Approval

Subject Code	25EES203	**Subject Title**	Electric Circuit Analysis
Category	ES	**L-T-P-C**	3-1-0-4
Regulation	2025	**Semester**	II
Prerequisites	Laws of Sine and Cosine, Complex Numbers, Solution of Linear simultaneous Equations, Differential and Integral Calculus, Laplace Transforms		

Course Objectives:

Analyze electric circuit with the application of fundamental laws to find response and evaluate performance

Course Content:

Circuit Elements and Laws (9+3 Hours)

Circuit Variables – mathematical relation - Circuit Elements – VI characteristics – Independent and dependent sources - Laws and Equivalent Networks (Source transformation and Network Reduction) - Sinusoids and Phasors - Waveforms - Average Value - Effective Value - Form factor – Peak factor – Sinusoids and exponentials - Phasor representation of sinusoids – Phasor transforms of Circuits

Networks Analysis and Theorems (9+3 Hours)

Mesh and Nodal Analysis – DC – AC Circuits – Super mesh and Super Node Analysis – Theorems - Thevenin's – Norton's – Super position – Maximum Power transfer – Millman's – Analysis using theorems.

AC Circuits and Resonance (9+3 Hours)

Phasor Analysis – Single Phase Circuits - Series – Parallel Circuits – Phasor diagram – Three Phase Circuits – Balanced and un-balanced Circuits – Neutral Shift - Power Analysis – Two watt-meter method - Series Resonance – Parallel Resonance – Bandwidth – Q factor – Selectivity.

Coupled Elements and Circuits (9+3 Hours)

Self and Mutual Inductances – Co-efficient of coupling – Dot convention – Assignment of dots to coupled coils - Series and parallel connection of coupled coils – Electrical equivalent of coupled coils – Linear and Ideal Transformers -Analysis of coupled circuits

Transient Analysis (9+3 Hours)

Natural and Forced Response – Classical analysis of RL, RC and RLC circuits – Initial and Final Values - DC excitation – AC excitation – Circuit element models in 's' domain – Transfer function of simple circuits – Impulse, step response to simple circuits.

TEXT BOOKS:

1. Joseph Edminister, “Theory and Problems of Electric Circuits”, 1st Edition, Schaums outline series, 1965.
2. J. David Irwin and R. Mark Nelms, "Basic Engineering Circuit Analysis", Wiley, 11th Edition, 2015.
3. Ashfaq Husain, “Circuit Theory”, Vol. 1 and 2, CBS Publishers, New Delhi.

REFERENCES BOOKS:

1.James W. Nilsson and Susan A. Riedel, “Electric Circuits”, 11th Edition, Pearson Education, 2020.
2. Charles K. Alexander and Matthew N. O. Sadiku, “Fundamentals of Electric Circuits”, 7th Edition, McGrawHill, 2021.
3. Nagoor Kani, “Circuit Analysis”, McGrawHill India, 2018.

Course Designed By	**BOS Approval**
Dr. J.S.Christy Mano Raj/Prof.	22.05.2025

Subject Code	25EES204	**Subject Title**	Electron Devices
Category	ES	**L-T-P-C**	3-0-0-3
Regulation	2025	**Semester**	II
Prerequisites	Basic physics		

Course Objectives:

Understand the physics and operation of electron devices and obtain appropriate equivalent circuit models

Course Content:

Carrier Distribution and Properties in Semiconductor (9 Hours)

Statistical Laws of particles – Maxwell-Boltzmann approximation - intrinsic and extrinsic - Equilibrium distribution – carrier concentration – $n_o p_o$ product- Fermi level (E_F) Position variation with doping and temperature – E_F relevance – Degenerate and non-degenerate - compensated semiconductors – Carrier – drift – diffusion – induced E-field in non-uniform doping – Einstein relation - generation – recombination – continuity equation – quasi Fermi energy.

PN Junction Diode (9 Hours)

Structure – Equilibrium conditions – Energy Band Concepts – Zero bias – Forward Bias – Reverse bias – Junction capacitances – one sided and non-uniformly doped junctions – Ideal PN junction current – Deviation from Ideal characteristic – Junction Breakdowns – Switching characteristic – Metal semiconductor junction.

Bipolar Junction Transistor (BJT) (9 Hours)

NPN – PNP - BJT Construction - Operation –- Transistor Currents – Gain - Transistor characteristics of CE, CB and CC – Non-ideal effects – Model - Ebers-Moll - Hybrid Pi - Frequency Limitations - Switching Characteristic.

Field Effect Transistors (9 Hours)

PN JFET – MESFET – Construction and operation – Pinch off – Saturation – Gate control – Ideal I-V Characteristic – Non-ideal effects – MOSFETs – Construction and characteristics.

Special and Opto-Electronic Devices (9 Hours)

Direct gap – Indirect gap Semiconductors - Construction – operation – characteristic – PIN diode – Zener diode Tunnel Diode – LED – Photo diode – Photo transistor – Opto-coupler – Laser Diode - Solar Cell – UJT.

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	COURSE OUTCOMES	Bloom's Level
CO1	Identify different phenomenon which control and modify the semiconductor device conduction.	L1
CO2	Analyze any device from the PN junction point of view with relevant excitation potentials.	L4
CO3	Construct an equivalent model of semiconductor devices including different parasitic effects.	L5
CO4	Choose the right semiconductor device for a typical application from its characteristic behavior.	L4
CO5	Perceive the devices potential operation in linear and non-linear mode of operation enabling him to design a circuit appropriately.	L5

TEXT BOOKS:

1. Donald Neamen and Dhrubes Biswas, "Semiconductor Physics and Devices", New Delhi: McGraw Hill Education (India), 4th Edition, 2012.

2.Donald Neamen, "Electronic Circuits Analysis and Design", Tata McGraw Hill, 3rd Edition, 2007.

REFERENCES BOOKS:

1.David A. Bell, "Electronic Devices and Circuits", New Delhi: Oxford University Press, 5th Edition, 2008.

2.Robert F.Pierret, "Semiconductor Device Fundamentals", New Delhi: Pearson India Education, 2th Edition, 2016.

Course Articulation matrix:

CO	Program Outcomes											Program Specific Outcomes		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	3	-	-	-	-	-	-	-	-	-	3	2	-
CO2	3	3	-	-	-	-	-	-	-	-	-	3	2	-
CO3	3	3	-	-	-	-	-	-	-	-	-	3	2	-
CO4	3	3	-	-	-	-	-	-	-	-	**1**	3	2	-
CO5	3	3	-		-	-	-	-	-	-	**1**	3	2	**1**

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By **BOS Approval**

Dr. J.S.Christy Mano Raj/Prof. 22.05.2025

Subject Code	25EES205	**Subject Title**	Electromagnetic Theory
Category	ES	**L-T-P-C**	3-1-0-4
Regulation	2025	**Semester**	II
Prerequisites	Basic Physics and Magnetic field knowledge		

Course Objectives:

To connect with the concepts of static and dynamic charges and weigh on electro- magnetic fields and solve complex problems

Course Content:

Introduction to Electro Magnetic Fields (9+3 Hours)

Sources and effects of electromagnetic fields – Coordinate systems and its Transformation – Gradient, Divergence and Curl – Gauss Divergence and Stoke's theorem – Coulomb's Law – Gauss Law and its Application.

Electric Fields (9+3 Hours)

Electric field due to point and continuous charges – Electric potential – Electric field and equipotential plots – Electric field in free space, conductors, dielectrics – Electric field in multiple dielectrics –Boundary conditions,– Capacitance and Energy density..

Magnetic Fields (9+3 Hours)

Biot- Savart'sLaw and its application – Magnetic field intensity – Ampere's Law and its application – Magnetic flux density in free space, conductor, magnetic materials – Magnetization – Magnetic field in multiple media – Boundary conditions – Magnetic potential – Magnetic force – Torque – Inductance and Energy density.

Electro Magnetic Fields (9+3 Hours)

Magnetic Circuits – Faraday's laws – Transformer and motional EMF – Forces and Energy in quasi stationary Electromagnetic Fields –– Displacement current – Poisson's and Laplace's equations – Maxwell's equations (differential and integral forms) – Relation between field theory and circuit theory.

Electromagnetic Waves (9+3 Hours)

Electromagnetic wave equations – Wave parameters: velocity, intrinsic impedance, propagationConstant – Waves in free space, Lossyand lossless dielectrics, conductors – Skin depth – Poynting theorem and Poynting vector - Introduction - EMI - EMC.

Total Hours: 60

Upon successful completion of this course, students will be able to:

CO	COURSE OUTCOMES	PO	Bloom's Level
CO1	Understand the importance of three different coordinate systems, Vector Calculus and theorems to solve problems in electric and magnetic fields.	---	L1,L2
CO2	Apply the concept of Electric fields and appraise energy density in the fields with help of fundamental laws.	1	L3
CO3	Analyze the various view magnetic fields and grade the magnetic potentials.	2	L4
CO4	Correlate electric and magnetic fields with help of Faraday's Law and Maxwell's Equations and analyze them.	3	L5
CO5	Critically think and develop innovative models the Electromagnetic fields and manage electromagnetic Wave propagation, Poynting theorem, Vector and solve problems.	5	L6
CO6	Participate actively in group discussion various types of magnets and prepare reports, presentations and documentations across diverse groups.	9,10	L3
CO7	Regarding Maxwell equations and boundary conditions which statements aligns with adaptability to new techlogies.	11	L2

TEXT BOOKS:

1. MathewN.O.Sadiku,"Elements of Electromagnetics", Oxford University press Inc. India Edition, 6th Edition, 2018.

2. Joseph. A. Edminister, "Theory and Problems of Electromagnetics", 2nd Edition, SchaumSeries, Tata McGraw Hill, 1993.

3. S.P.Seth,"Elements of Electromagnetic Fields",Dhanpath Rai & Sons, New Delhi, 2011.

REFERENCES BOOKS:

1. *AshutoshPramanik,"Electromagnetism–Theory and Applications",Prentice-Hall of India Private Limited, New Delhi, 2008.*

2.William. H. Hayt, "Engineering Electromagnetics", Tata McGraw Hill, 2011.

3.Kraus and Fleish,"Electromagnetics with Applications", McGraw Hill International Editions, 5th Edition, 1999.

4.K.A.Gangadhar,P.M.Ramanthan 'Electromagnetic Field Theory (including Antennaes and wave propagation)', 16th Edition, Khanna Publications,2008.

Course Articulation matrix:

CO	Program Outcomes											Program Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	3	2	-
CO4	-	-	3	-	-	-	-	-	-	-	-	2	1	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-	2	3
CO6	-	-	-	-	-	-	-	-	3	2	-	-	3	1
CO7	-	-	-	-	-	-	-	-	-	-	3	-	2	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By **BOS Approval**

Dr. R.Francis /ASP. 22.05.2025

25ZMC206

தமிழரும் தொழில்நுட்பமும்

L T P C
1 0 0 1

அலகு I **நெசவு மற்றும் பானைத் தொழில்நுட்பம்:** 3

சங்க காலத்தில் நெசவுத் தொழில் – பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் – பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு II **வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:** 3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் – சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் – நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் – செட்டிநாட்டு வீடுகள் – பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை.

அலகு III **உற்பத்தித் தொழில் நுட்பம்:** 3

கப்பல் கட்டும் கலை – உலோகவியல் – இரும்புத் தொழிற்சாலை – இரும்பை உருக்குதல், எஃகு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் – நாணயங்கள் அச்சடித்தல் – மணி உருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள், கண்ணாடி மணிகள் – சுடுமண் மணிகள் – சங்கு மணிகள் – எலும்புத்துண்டுகள் – தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV **வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்:** 3

அணை, ஏரி, குளங்கள், மதகு – சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார் சமூகம்.

அலகு V **அறிவியல் தமிழ் மற்றும் கணித்தமிழ்:** 3

அறிவியல் தமிழின் வளர்ச்சி –கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – தமிழ் மின் நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

25MC206

TAMILS AND TECHNOLOGY **L T P C 1 0 0 1**

UNIT I **WEAVING AND CERAMIC TECHNOLOGY** 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II **DESIGN AND CONSTRUCTION TECHNOLOGY** 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
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8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

GOVERNMENT COLLEGEOF ENGINEERING, BARGUR-635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Electrical and Electronics Engineering

Subject Code	25EES207	**Subject Title**	**Electric Circuits Laboratory**
Category	ES	**L-T-P-C**	**0-0-3-1.5**
Regulation	2025	**Semester**	II
Prerequisites	Electric Circuit and Electron Device knowledge		

Course Objectives:

To conduct experiment on electric circuits and Electron devices and get performances

Course Content:

1. Verification of KVL and KCL
2. Verification of Thevinin's Theorem, Superposition Theorem and Max. Power Transfer Theorem.
3. Determination of Q factor for the given AC circuit
4. Determination of self and mutual inductance of the given coupled circuit
5. Time response of RL and RC circuit
6. Time response of RLC circuit for over damped and under damped cases
7. Determination of Power factor of a given single phase ac circuits using DSO and power measurement.
8. Fixation of dots for the given two winding coupled transformer
9. Three phase power measurement using two wattmeter method.
10. Experimentation of series and parallel resonance
11. Verification of mesh and nodal analysis

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	COURSE OUTCOMES	Bloom's Level
CO1	Analyze any Electric circuits using mesh analysis, nodal analysis, and network theorems for the determination of steady state parameters	L4
CO2	Analyze the time and frequency response electric circuits	L4
CO3	Measurement of working parameters of a given Electric Circuit.	L5

Course Articulation Matrix:

CO	Program Outcomes											Program Specific Outcomes		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	2	3	2	2	-	**-**	**-**	**-**	-	**-**	3	2	1
CO2	3	2	3	2	2	2	**-**	**-**	**-**	-	**-**	3	2	1
CO3	3	2	3	2	2	2	-	**-**	**-**	-	**-**	3	2	1

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
Dr. J.S.Christy Mano Raj/Prof.

BOS Approval
22.05.2025

Subject Code	25EES208	**Subject Title**	**Electrical and Electronics Engineering Practices Laboratory**
Category	ES	**L-T-P-C**	**0-0-3-1.5**
Regulation	2025	**Semester**	II
Prerequisites	Electric Circuit and Electron Device knowledge		

Course Objectives:

To use hand tools and equipment in house wiring, plumbing and PCB soldering and testing.

Course Content:

1. Arranging and wiring of Meter board (Energy meter, Fuse unit, RCCB, isolator) and LDB with single, 2, 3, 4 pole MCB.
2. Study of phase, neutral, earth and single phase & three phase system.
3. Study of basic safety measures at home and industry.
4. Selection of Fuse, Wire, MCB and RCCB, RCBO ratings.
5. Basic household wiring using Switches, Fuse, Indicator and Lamp, ceiling fan.
6. Stair case light wiring.
7. Tube- light, CFL wiring.
8. Study of Iron-Box, Fan Regulator and Electric ballasts
9. Preparation of wiring diagrams for a given situation.
10. Soldering and de-soldering practice.
11. Assembly of electronic circuits in a PCB, Testing & verification.
12. Assembly of electric circuit with appropriate coordination of protective devices.

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	COURSE OUTCOMES	Bloom's Level
CO1	Select right tools and equipment for carrying out minor works /repair electrical wiring.	L3
CO2	Select appropriate protection devices and do electrical wiring for Electrical applications	L4
CO3	Fabricate simple electronic circuits, testing and finalizing for simple applications.	L5

Course Articulation Matrix:

CO	Program Outcomes											Program Specific Outcomes		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	3	3	2	1	-	-	1	-	-	2	3	2	1
CO2	3	3	3	2	1	-	-	1	-	-	2	3	2	1
CO3	3	3	3	2	1	-	-	1	-	-	2	3	2	1

Course Articulation Matrix:

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By **BOS Approval**

Dr. J.S.Christy Mano Raj/Prof. 22.05.2025

Semester-III

Subject Code	**25EBS301**	**Subject Title**	**COMPLEX ANALYSIS, DIFFERENCE EQUATIONS AND PROBABILITY & STATISTICS**
Category	Basic science	**L-P-T-C**	3-0-1-4
Regulation	2025	**Semester**	III
Prerequisites	Basic knowledge of **calculus, complex numbers, algebra, and fundamental concepts of probability and statistics.**		

Course Objectives:

1. To introduce the fundamental concepts of **functions of a complex variable and analytic functions**.
2. To develop the ability to apply **complex integration techniques and residue theorem** in evaluating integrals.
3. To understand and solve difference equations.
4. To study the basic principles of **probability and random variables**.
5. To analyze **statistical measures such as correlation and regression** for interpreting relationships between variables.

COURSE CONTENT:

[**ANALYTIC FUNCTIONS**] **(9+3)**

Functions of a complex variable – Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic function – Conformal mapping – Mapping by functions $w = z+k$, kz, $1/z$, z^2 – Bilinear transformation.

[**COMPLEX INTEGRATION**] **(9+3)**

Complex integration – Cauchy's integral theorem and Cauchy's integral formula – Laurent's series – Singularities – Residues – Cauchy's residue theorem – Application of the residue theorem for evaluation of real integrals – Applications of circular and semicircular contours (excluding poles on the real axis).

[DIFFERENCE EQUATION] (9+3)

Difference equations – Order and degree – Formation of difference equations – Difference operators (Δ, ∇, E) and their properties – Linear difference equations with constant coefficients (homogeneous and non-homogeneous).

[PROBABILITY AND RANDOM VARIABLES] (9+3)

Probability – Axioms of probability – Conditional probability – One-dimensional random variables – Discrete and continuous random variables – Expectation – Two-dimensional random variables – Joint distributions – Marginal distributions.

[STATISTICAL MEASURE, CORRELATION AND REGRESSION] (9+3)

Expectation of two-dimensional random variables and its properties – Linear correlation – Correlation coefficient and its properties – Linear regression.

Total Hours: 60

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Recall the fundamental definitions, concepts, and basic properties of analytic functions, complex integration, difference equations, probability, and statistical averages.	L1
CO2	Explain the concepts and principles of analytic functions, complex integration, difference equations, probability, and statistical averages.	L2
CO3	Apply theorems, formulas, and mathematical techniques to solve problems in analytic functions, complex integration, difference equations, probability, and statistical averages.	L3
CO4	Analyze mathematical problems by identifying appropriate methods in analytic functions, complex integration, difference equations, probability, and statistical analysis.	L4
CO5	Evaluate the validity and suitability of different mathematical methods used in analytic functions, complex integration, difference equations, probability, and statistical analysis.	L5

Text Books:

1. Grewal, B.S., “Higher Engineering Mathematics”, 44th Edition, Khanna Publishers, New Delhi, 2018.
2. Grewal, B.S., and Grewal, J.S., “Numerical Methods in Engineering and Science”, 9th Edition, Khanna Publishers, New Delhi, 2007.
3. Johnson, R.A., Miller, I., and Freund, J., “Miller and Freund’s Probability and Statistics for Engineers”, 9th Edition, Pearson Education Asia, 2016.

Reference Books:

1. Bali, N.P., and Goyal, M., “*A Textbook of Engineering Mathematics”,* 9th Edition, Laxmi Publications Pvt. Ltd., 2016.
2. Devore, J.L., “*Probability and Statistics for Engineering and the Sciences”*, 9th Edition, Cengage Learning, 2016.
3. Goldberg, S., “*Introduction to Difference Equations”*, Dover Publications, New York, 1986.
4. Kandasamy, P., Thilagavathy, K., and Gunavathi, K., “*Numerical Methods”,* S. Chand & Company Ltd., New Delhi, 2010.

E-Resources:

1. https://nptel.ac.in/courses
2. https://nptel.ac.in/courses/111106141
3. https://nptel.ac.in/courses/111105041

Course Articulation matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	1	-	-	-	-	-	-
CO4	3	3	2	3	1	-	-	-	-	-	-
CO5	3	3	3	3	1	-	-	-	-	-	-

CorrelationLevels:3- Strong,2- Medium,1 -Low, - (dash)-No correlation

Course Designed By

S.Gowtham Prakash, AP(T)/Maths

S.Vadivel, AP(T)/Maths

BOS Approval

Date:12.03.2026

Subject Code	25EPC302	**Subject Title**	Measurements and Instrumentation
Category	PC	**L-T-P-C**	3-0-0-3
Regulation	2025	**Semester**	III
Prerequisites	Electric Circuit Analysis, Electromagnetic Theory		

Course Objectives:

To acquire the knowledge of different Electrical and Electronic Measuring Instruments and Measurement techniques.

Course Content:

INTRODUCTION To MEASUREMENTS AND BASIC INSTRUMENTS (9 Hours)

Functional elements of an instrument–Instrument characteristics–Errors–Statistical evaluation of measurement data–Standards and calibration– Permanent magnet Moving Coil and Attraction type Moving Iron Instrument: Construction, Torque Equation, Range Extension, and Effect of temperature.

ELECTRICAL AND ELECTRONIC INSTRUMENTS (9 Hours)

Single and three phase wattmeters- Single and three phase energy meters: Digital energy meter and smart energy meter–Magnetic measurements–Determination of B-H curve and measurements of iron loss–Instrument transformers: CT and PT- CT saturation-Ratio and Phase angle errors –Resonant type frequency meter, western type synchroscope and dynamometer power factor.

BRIDGES AND INSTRUMENTATION AMPLIFIER (9 Hours)

D.C bridges: Wheatstone- Kelvin Double bridge –A.C bridges: Maxwell-Anderson-Schering and Wien bridges–Errors and compensation in A.C. bridges-Instrumentation Amplifier and its applications.

STORAGE AND DISPLAY DEVICES (9 Hours)

Signal sources, Oscilloscopes - CRO, Digital storage and Analog Storage Oscilloscope, Analog & Digital Recorders, digital multi-meters, Digital voltmeters -LED, LCD display–Data Loggers.

TRANSDUCERS AND DATA ACQUISITION SYSTEMS (9 Hours)

Elements of data acquisition system -Classification of transducers –Selection of transducers– Thermistors, RTD , Thermocouple**-**LVDT-Inductive proximity switches – Piezoelectric, Hall effect, photo diode and Photo transistor –Applications of Lasers in Measurements-Shaft Encoders-Resolvers– Brief introduction to Smart sensors and its applications in IOT.

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	COURSE OUTCOMES	Bloom's Level
CO1	Explain the functions of Electrical and Electronic measuring instruments.	L2
CO2	Choose an appropriate measuring instrument for Electrical parameter measurement applications.	L3
CO3	Analyze the measured data using various display devices.	L4
CO4	Estimate the values of passive elements using bridges.	L5
CO5	Design an Instrumentation system for measurement applications.	L6

TEXT BOOKS:

1. A.K. Sawhney, "A Course in Electrical & Electronic Measurements &Instrumentation", Dhanpat Rai and Co, 2020.

2. J. B. Gupta, "A Course in Electronic and Electrical Measurements", S. K. Kataria &Sons, Delhi, 2024.

3. John G Webster, "The Measurement, Instrumentation and Sensors Handbook" IEEE press,1999

REFERENCES BOOKS:

1. H.S. Kalsi, "Electronic Instrumentation", McGraw Hill, III Edition 2010.

2. D.V.S. Murthy, "Transducers and Instrumentation", Prentice Hall of India Pvt Ltd, 2015.

3. David Bell, "Electronic Instrumentation &Measurements", Oxford University Press, 2013.

4. Martin Reissl and, "Electrical Measurements", New Age International (P) Ltd., Delhi, 2001.

5. Alan. S. Morris, "Principles of Measurements and Instrumentation", 2nd Edition, Prentice Hall of India, 2003

Course Designed By

Name & Designation

Dr.K.Mohan

Assistant Professor/EEE

BOS Approval

Date: 13.03.2026

Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	3	2	–	2	-	-	-	-	2	-	3	2	-
CO2	3	3	2	–	2	-	-	-	-	2	-	3	2	-
CO3	3	3	2	–	2	-	-	-	-	2	-	3	2	-
CO4	3	3	2	–	2	-	-	-	-	2	-	3	2	-
CO5	3	3	2	–	2	-	-	-	-	2	-	3	2	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Subject Code	25EPC303	**Subject Title**	**MAGNETICS, DC MACHINES AND TRANSFORMERS**
Category	Program core	**L-P-T-C**	3-1-0-4
Regulation	2025	**Semester**	III
Prerequisites	Electric Circuit Analysis, Electromagnetic Theory		

Course Objectives:

To understand the working of DC machines and transformers using principles of electromagnetism and electromechanical energy conversion and to study the characteristics and testing of DC machines and transformers

Course Content:

[INTRODUCTION] (12 Hours)

Review of Magnetic Circuit Parameters – Magnetic Circuit with air gap – Leakage flux and fringing – magnetization Curve, Hysteresis loss and Eddy Current Loss – Magnetically Induced EMF and Force – AC operation of magnetic Circuits – Energy in Magnetic Circuits and Mechanical Force – Multiple Excited Magnetic Field system – Electromechanical Energy Conversion – MMF of distributed AC windings and Rotating Magnetic field – Torque in Round Rotor Machine.

[DC GENERATORS] (12 Hours)

Construction details of DC machine – Principle of operation of DC generator – Emf equation – Armature reaction and Compensating winding – Commutation and Interpoles – Methods of excitation – Characteristics of DC generators – Parallel operation of DC generators – Applications.

[DC MOTORS] (12 Hours)

Principle of operation of DC motor – Back Emf and torque equation – Characteristics of DC motors – Starting of DC Motors – Types of DC motor starters – Speed control of DC motors – Braking of DC motors.

[TRANSFORMERS] (12 Hours)

Construction details of core and shell type transformers – Principle of operation – Emf equation and Transformation ratio – Transformer on no-load – Real transformer and Equivalent circuit – Transformer on load – Voltage Regulation – Parallel operation of single-phase transformers – Auto transformer – Introduction to Three phase transformers: Vector diagrams and Connections.

[TESTING OF DC MACHINES AND TRANSFORMERS] (12 Hours)

DC machines: Losses and efficiency – Condition for Maximum Efficiency – Testing of DC machines: Brake test, Swinburne's test, Retardation test and Hopkinson's test

Transformers: Losses and efficiency – All Day Efficiency – Condition for Maximum Efficiency – Separation of No load losses – Testing of transformers: Load test, open circuit and short circuit tests, Sumpner's test and Polarity test.

LECTURE: 45 PERIODS, TUTORIAL: 15 PERIODS, TOTAL: 60 PERIODS

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Explain the fundamental concepts of magnetic circuits, electromagnetic induction, and electromechanical energy conversion in electrical machines.	L2
CO2	Apply the principles of operation to analyze the performance of DC generators and transformers using EMF equations, equivalent circuits, and operating characteristics.	L3
CO3	Demonstrate the methods of speed control, starting, and braking of DC motors and evaluate their performance in practical applications.	L3
CO4	Analyze the characteristics of DC generators and DC motors under various operating conditions, including armature reaction, commutation, and load variations.	L4
CO5	Evaluate the performance of transformers and DC machines by calculating efficiency, voltage regulation, and losses under different loading conditions.	L4
CO6	Assess and interpret the results of various testing methods (DC machines and transformers) to determine performance characteristics and operational suitability.	L5

Text Books:

1. Fitzgerald A.E. Kingsly C., Umans S.D., '*Electrical Machinery'* 6th edition, McGraw Hill International Edition, New York, 2002.

2. Kothari D.P. and Nagrath I.J , "*Electric Machines*", Tata McGraw Hill, Fourth Ed.,2011.

3. Jacek F. Gieras, "Electrical Machines: Fundamentals of Electromechanical Energy Conversion", CRC press,2016

Reference Books:

1. *D.P.Kothari, "Electrical Machines" 3rd edition, TMH, New Delhi 2004.*

2. *P.C.Sen, "Principles of Electrical Machines and Power Electronics", John-Wiley & Sons, Newyork.*

3. *Cotton H, "Advanced Electrical Technology", CBS Publishers and Distributors, 1967.*

4. *P.S.Bimbhra, 'Electrical Machinery',Khanna Publishers,2003.*

5. *P. C. Krause, O. Wasynczuk and S. D. Sudhoff, "Analysis of electric machinery," IEEE Press, 1995.*

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	0	0	0	0	0	0	0	0	0	3	1	1
CO2	3	3	1	0	1	0	0	0	0	0	0	3	2	1
CO3	3	3	1	2	0	0	0	0	0	0	0	3	2	2
CO4	3	2	2	0	1	0	0	0	0	0	0	3	2	2
CO5	3	3	1	2	0	0	0	0	0	0	0	3	2	2
CO6	3	3	0	3	1	0	0	0	0	0	1	3	3	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Dr.V.Arivumani, AP/EEE

BOS Approval

Date: 13.03.2026

Subject Code	25EPC304	**Subject Title**	**Analog Electronic Circuits**
Category	Program core	**L-P-T-C**	3-0-0-3
Regulation	2025	**Semester**	III
Prerequisites			

Course Objectives:

To learn the characteristics, applications of PN junction Diode, Zener diode, UJT, BJT, FET and to design amplifiers, oscillators and pulse circuits.

Course Content:

[PN JUNCTION DIODE AND ITS APPLICATIONS] (09 Hours)

Review of PN junction diodes(not for Exams)- Rectifiers: HW, FW, Bridge Rectifiers, filters-C filter-LC filter and CLC filter - Zener diode based voltage regulators - Diode clampers and clippers. Peak Detector - Applications of Diodes.

[BJT AND FET] (09 Hours)

Review of BJT and FET(not for Exams) –Need for biasing - Different types of biasing circuits for BJT-FET-Comparison of biasing circuits-Small signal analysis of BJT ,FET and MOSFET amplifier Circuits-input impedance ,output impedance, voltage gain, current gain and power gain

AMPLIFIERS (09 Hours)

Classification of amplifiers –- frequency response - Class A, B, AB, C and D - RC and transformer coupled power amplifiers - Class B complementary- symmetry, push- pull power Amplifiers-Quasi complementary symmetry amplifier-Darlington pair.

FEEDBACK AMPLIFIERS AND OSCILLATORS (09 Hours)

Differential amplifiers: Common Mode and Differential Mode - CMRR – feedback amplifiers -Voltage / current, series / shunt feedback – condition for oscillation - oscillators – LC, RC, crystal oscillators.

PULSE CIRCUITS (09 Hours)

RC wave shaping circuits – Monostable, Astable and Bistable Multivibrators – Schmitt triggers – UJT-construction and operation- relaxation oscillators –Design of multivibrators and relaxation oscillators.

LECTURE: 45 PERIODS

Upon successful completion of this course, students will be able to:

CO	**Course Outcome**	**Bloom's Level**
CO1	Explain the need and applications of electronics devices in various circuits.	L1
CO2	Apply the electronic circuit characteristics for various applications.	L3
CO3	Analysis of electronic circuit characteristics for specific output.	L4
CO4	Design and develop electronic circuits.	L5
CO5	Create electronic circuits using multisim software	L6

CO6	Develop coding for electronic circuits operation	L6

Text Books:

1. Robert Boylestad and Lowis Nashelsky, "Electronic Devices and Circuit Theory", 10th Edition, Pearson Education, 2009.

2. David A. Bell, "Electronic Devices and Circuits", 5th Edition, Prentice Hall India, 2010.

Reference Books:

1. Floyd T.L," Electronic Devices", 7th Edition, Pearson Education, 2009

2. Albert Malvino and David J.Bates, "Electronic Principles",7th Edition, Tata Mc-Graw Hill, 2007.

3. Jacob Millman, Halkias C.C and Satyabrata Jit, "Electronic Devices and Circuits", 3rd Edition,Tata Mc-Graw Hill, 2010

4. Rashid, "Microelectronic Circuits", Thomson Publication, 1999.

5. Singh. B.P and Rekha Singh, "Electronic Devices and Integrated Circuits", Pearson Education, 2006.

6. Theodre F. Boghert, "Electronic Devices & Circuits" Pearson Education, 6th Edition, 2003.Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	2	–	3	-	-	-	-	3	-	3	2	-
CO2	3	2	2	–	3	-	-	-	-	3	-	3	2	-
CO3	3	2	2	–	3	-	-	-	-	3	-	3	2	-
CO4	3	2	2	–	3	-	-	-	-	3	-	3	2	-
CO5	3	2	2	–	3	-	-	-	-	3	-	3	2	-

***Correlation** Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation*

Course Designed By

Name & Designation

Dr.K.Thirumal,AP/EEE

BOS Approval

Date: 13.03.2026

Subject Code	25EPC305	Subject Title	DIGITAL LOGIC CIRCUITS
Category	Professional Core	L-P-T-C	3-0-0-3
Regulation	2025	Semester	III
Prerequisites			

Course Objectives:

1. To learn concepts and Design techniques used in the Digital Logic Circuits and also to familiarize the Hardware description language in the design of Digital circuits.

Course Content:

[NUMBER SYSTEMS AND DIGITAL LOGIC FAMILIES] (9-Hours)

Review of number systems, binary codes, error detection and correction codes (Parity and Hamming code) – Digital Logic Families – Comparison of RTL, DTL, TTL, ECL and MOS families – Operation, characteristics of digital logic family.

[**COMBINATIONAL CIRCUITS] (9-Hours)**

Combinational logic – Representation of logic functions – SOP and POS forms – K-map representations – Minimization using K maps – Simplification and implementation of combinational logic – Multiplexers and de-multiplexers – Code converters, adders, subtractors, Encoders and Decoders.

[**SYNCHRONOUS SEQUENTIAL CIRCUITS] (9-Hours)**

Sequential logic – SR, JK, D and T flip flops – Level triggering and edge triggering – Counters – Asynchronous and synchronous type – Modulo counters – Shift registers – Design of synchronous sequential circuits – Moore and Melay models – Counters – State diagram – State reduction – State assignment.

[**ASYNCHRONOUS SEQUENTIAL CIRCUITS AND PROGRAMMABLE LOGIC DEVICES] (9-Hours)**
Asynchronous sequential logic circuits –Race conditions, hazards & errors in digital circuits – Analysis of asynchronous sequential logic circuits –Introduction to Programmable Logic Devices: PROM – PLA –PAL – CPLD – FPGA

[**DESIGN AND IMPLEMENTATION OF LOGIC CIRCUITS] (9-Hours)**

RTL Design – Combinational logic – Sequential circuit – Operators – Introduction to Packages – Subprograms – Test bench. Simple VHDL Coding for basic digital Structures (Gates, Flip-Flops, Adders and Counters)

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Understand the basic concepts of number systems, logic gates, digital logic families, combinational and sequential circuits, programmable logic devices and RTL design.	L2
CO2	Apply the principles of digital logic to analyze and simplify combinational and sequential circuits.	L3
CO3	Design basic digital circuits such as adders, multiplexers, flip-flops, counters and shift registers.	L5
CO4	Analyze the operation of synchronous and asynchronous sequential circuits and identify problems such as hazards, race	L4

	conditions and errors in digital circuits.	
CO5	Design and implement combinational and sequential digital circuits using RTL/VHDL and ensure their correctness through simulation and verification**.**	L5

Text Books:

1. James W. Bignel, Digital Electronics, Cengage learning, 5th Edition, 2007.
2. M. Morris Mano, 'Digital Design with an introduction to the VHDL', Pearson Education, 2013.
3. Comer "Digital Logic & State Machine Design, Oxford, 2012.

Reference Books:

1. Mandal, "Digital Electronics Principles & Application, McGraw Hill Edu, 2013.
2. William Keitz, "Digital Electronics-A Practical Approach with VHDL", Pearson, 2013.
3. Thomas L.Floyd, "Digital Fundamentals", 11th edition, Pearson Education, 2015.
4. Charles H.Roth, Jr, LizyLizy Kurian John, "Digital System Design using VHDL", Cengage, 2013.
5. D.P.Kothari, J.S.Dhillon, "Digital circuits and Design", Pearson Education, 2016.

COURSE ARTICULATION MATRIX

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	PSO1	PSO2	PSO3
CO1	3	2	2	-	2	-	1	-	-	-	-	3	3	2
CO2	3	3	2	2	1	1	-	-	-	-	-	3	2	-
CO3	3	1	3	2	2	-	-	1		-	-	3	2	2
CO4	3	3	1	3	-	2	-	2	-	-	2	3	2	2
CO5	3	3	3	-	3	-	-	-	2	2	1	3	2	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Name & Designation

Dr. K. Asokan

ASP/EEE

BOS Approval

Date: 13.03.2026

25ZMC307	CONSTITUTION OF INDIA	L	T	P	C
Common to MECH, EEE, ECE and CSE Branches		1	0	0	0

Course Objective:

To provide understanding of basic concepts of Indian Constitution and various organs created by the constitution including their functions.

INTRODUCTION

Constitution' Definition and Classification -Constitutional Organs - Indian Constitution: Sources and constitutional history, Salient features of Indian Constitution - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State PolicyRule of Law - Separation of powers Constitution - Doctrine of Basic Structure.

UNION GOVERNMENT & STATE GOVERNMENT AND THEIR ADMINISTRATION

Distribution of Powers between Center and States Structure of the Indian Union: Federalism, Centre- State -relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha.

Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

LOCAL ADMINISTRATION

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments),Village level: Role of Elected and Appointed officials, Importance of grass root democracy Emergency Provisions -

ELECTION COMMISSION

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

Recommended References:

1. V.N. Shukla, Constitution of India
2. M.P. Jain – Indian Constitutional Law.
3.H.M.Seervai : Constitution of India
4.D.D.Basu: Shorter Constitution of India
5.Kagzi : Indian Constitution
6.Pylee : The History of Indian Constitution

Subject Code	25EPC308	**Subject Title**	Measurements and Instrumentation Laboratory
Category	PC	**L-T-P-C**	0-0-3-1.5
Regulation	2025	**Semester**	III
Prerequisites	Electric Circuit Analysis, Electromagnetic Theory		

Practicals:

List of Experiments.

1.Demonstration of measurement and instrument errors
2. Calibration of Ammeter and voltmeter.
3. Measurement of power, power factor and energy for RL Load.
4. Measurement of current and voltage using CT and PT
5. Demonstration of Signal Conditioning using bridge circuit and frequency measurement.
6. Measurement of various Electrical parameters using CRO and DSO.
7. Measurement of Temperature using resistive transducers.
8. Measurement of displacement using inductive transducer and Positional encoder.
9. Measurement of Resistance, inductance and Capacitance using bridge circuits.
10. Design and Implementation of Instrumentation Amplifier.

TOTAL :45 PERIODS

OUTCOMES: After completion of this course, the student will be able to:

1.	Identify different errors while measuring Electrical quantity.
2.	Choose the appropriate instruments for measuring Electrical parameters.
3.	Develop an instrumentation system using transducers.

Articulation matrix:

CO	**Program Outcomes (PO)**											**PSO**		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	2	–	3	-	-	3	3	3	-	3	2	-
CO2	3	2	2	–	3	-	-	3	3	3	-	3	2	-
CO3	3	2	2	–	3	-	-	3	3	3	-	3	2	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Name & Designation

Dr.K.Mohan

BOS Approval

Date: 13.03.2026

Subject Code	25EPC309	**Subject Title**	**DC MACHINES AND TRANSFORMERS LABORATORY**
Category	Program core	**L-P-T-C**	0-3-0-1.5
Regulation	2025	**Semester**	III
Prerequisites			

Course Objectives:

The primary objective of this laboratory course is to provide hands-on training for:

- Drawing the characteristics of DC Generators, Motors, and Transformers.
- Evaluating the performance of these electrical machines

Course Content:

1. Study of starters: 2-point, 3-point and 4-point starters.
2. Open circuit and load characteristics of DC shunt generator.
3. Load characteristics of DC compound generator with differential and cumulative connections
4. Load Test on DC series generator.
5. Load test on DC shunt and compound motor.
6. Load test on DC series motor.
7. Swinburne's test and speed control of DC shunt motor.
8. Load test on single-phase transformer and three phase transformers.
9. Open circuit and short circuit test on single phase transformer.
10. Sumpner's test on single phase transformers.
11. Separation of no-load losses in single phase transformers.
12. Parallel operation of single phase transformer.
13. Hopkinson Test.

TOTAL : 45 PERIODS

Upon successful completion of this course, students will be able to:

CO	**Course Outcome**	**Bloom's Level**
CO1	Understand and apply the principles of machine starting mechanisms using 2-point, 3-point, and 4-point starters	L1
CO2	Conduct experiments to draw and analyze the characteristics of various DC generators (shunt, compound, and series)	L2
CO3	Perform performance evaluations of DC motors through direct load testing and speed control techniques	L3
CO4	Execute indirect testing methods (such as Swinburne's and Hopkinson's tests) to predetermine the efficiency and performance of DC machines	L4

CO5	Evaluate transformer performance and analyze losses through load tests, OC/SC tests, and specialized tests like Sumpner's and loss separation	L5

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	2	–	3	-	-	-	-	3	-	3	2	-
CO2	3	2	2	–	3	-	-	-	-	3	-	3	2	-
CO3	3	2	2	–	3	-	-	-	-	3	-	3	2	-
CO4	3	2	2	–	3	-	-	-	-	3	-	3	2	-
CO5	3	2	2	–	3	-	-	-	-	3	-	3	2	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Dr.V.Arivumani, AP/EEE

BOS Approval

Date: 13.03.2026

Subject Code	25EPC310	**Subject Title**	**Analog Electronics Laboratory**
Category	Program core	**L-P-T-C**	3-0-0-3
Regulation	2025	**Semester**	III
Prerequisites			

Course Objectives:

To verify experimentally the characteristics, applications of PN junction Diode, Zener diode, UJT, BJT, FET and to design amplifiers, oscillators and pulse circuits.

Course Content:

LIST OFEXPERIMENTS:
1. Diode Clippers and Clampers.
2. Single phase half wave and full wave rectifiers.
3. Characteristics of Zener diode and voltage regulators.
4. Characteristics of Transistor under CE, CC and CB configurations.
5. Characteristics of FET, MOSFET and UJT.
6. Transistor biasing.
7. Frequency response of Common Emitter and Common Collector Amplifiers.
8. Frequency response of Common Source FET Amplifier.
9. Power Amplifiers.
10. Design of RC Phase Shift and Wien bridge Oscillators.

LECTURE: 45 **PERIODS**

Upon successful completion of this course, students will be able to:

CO	**Course Outcome**	**Bloom's Level**
CO1	Obtain accurately the characteristics of electronic devices (BJT, UJT, FET and MOSFET) independently.	L1
CO2	Analyze the performance of the wave shaping circuits (Clippers, Clampers), voltage regulators and half wave & full wave rectifiers designed using diodes.	L4
CO3	Analyze the performance of various amplifiers with different configurations based on BJT and FET, and design of RC Phase Shift and Wien bridge Oscillators.	L4

Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	2	–	3	-	-	3	3	3	-	3	2	-
CO2	3	2	2	–	3	-	-	3	3	3	-	3	2	-
CO3	3	2	2	–	3	-	-	3	3	3	-	3	2	-

***Correlation** Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation*

Course Designed By

Name & Designation

Dr.K.Thirumal,AP/EEE

BOS Approval

Date:13.03.2026

Semester-IV

Subject Code	**25EBS401**	**Subject Title**	**NUMERICAL METHODS**
Category	Basic Science	**L-P-T-C**	3-0-1-4
Regulation	2025	**Semester**	IV
Prerequisites	Basic knowledge of **calculus, matrices, and differential equations** along with familiarity in solving algebraic equations.		

Course Objectives:

1. To introduce numerical methods for solving algebraic and transcendental equations, systems of linear equations, and eigenvalue problems.
2. To develop interpolation techniques for constructing approximating polynomials.
3. To provide numerical methods for differentiation and integration.
4. To apply numerical techniques to solve initial value problems in ordinary differential equations.
5. To evaluate finite difference methods for solving boundary value problems in ordinary and partial differential equations.

Course Content:

[SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS] (9+3 Hours)
Solution of algebraic and transcendental equations – Fixed-point iteration method – Bisection method – Newton-Raphson method – Solution of linear systems of equations – Gauss elimination method – Gauss-Jordan method – Iterative methods of Gauss-Jacobi and Gauss-Seidel – Matrix inversion using Gauss-Jordan method – Eigenvalues of a matrix by the Power method. **[INTERPOLATION AND APPROXIMATION] (9+3 Hours)**
Interpolation with equal intervals – Newton's forward and backward difference formulae – Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided-difference interpolation – Cubic splines.
[NUMERICAL DIFFERENTIATION AND INTEGRATION] (9+3 Hours)
Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal rule, Simpson's 1/3 rule – Romberg's method – Two-point and three-point Gaussian quadrature formulae – Evaluation of double integrals using Trapezoidal and Simpson's 1/3 rules. **[INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS] (9+3 Hours)**
Single-step methods – Taylor's series method – Euler's method – Modified Euler's method – Fourth-order Runge-Kutta method for solving first-order equations – Multi-step methods – Milne's and Adams-Bashforth predictor-corrector methods for solving first-order equations.
[BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS] (9+3 Hours)
Finite difference methods for solving second-order two-point linear boundary value problems – Finite difference techniques for the solution of two-dimensional Laplace's and Poisson's equations on a rectangular domain – One-dimensional heat flow equation by explicit and implicit (Crank-Nicolson) methods – One-dimensional wave equation by the explicit method.

Total Hours: 60

Upon successful completion of this course, students will be able to:

CO	**Course Outcome**	**Bloom's Level**
CO1	Recall numerical methods for solving equations, eigenvalue problems, numerical differentiation, integration, and finite difference methods.	L1
CO2	Explain interpolation techniques and numerical methods for approximating derivatives and integrals, and for solving ordinary differential equations.	L2
CO3	Apply numerical methods to solve algebraic equations, perform numerical integration,	L3

	and solve ordinary differential equations and partial differential equations.	
CO4	Analyze the accuracy, convergence, and errors in interpolation, numerical differentiation, and numerical integration methods.	L4
CO5	Evaluate the efficiency and effectiveness of numerical techniques used for interpolation, initial value problems, and partial differential equations.	L5

Text Books:

1. Grewal, B.S., and Grewal, J.S., *Numerical Methods in Engineering and Science*, 9th Edition, Khanna Publishers, New Delhi, 2007.
2. Gerald, C.F., and Wheatley, P.O., *Applied Numerical Analysis*, 7th Edition, Pearson Education Asia, New Delhi, 2007.
3. Burden, R.L., and Faires, J.D., *Numerical Analysis*, 9th Edition, Cengage Learning, 2011.

Reference Books:

1. Chapra, S.C., and Canale, R.P., *Numerical Methods for Engineers*, 7th Edition, Tata McGraw-Hill, New Delhi, 2016.
2. Bradie, B., *A Friendly Introduction to Numerical Analysis*, Pearson Education Asia, New Delhi, 2007.
3. Sankara Rao, K., *Numerical Methods for Scientists and Engineers*, 3rd Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2007.

E-Resources:

1. https://nptel.ac.in/courses
2. https://nptel.ac.in/courses/111107105
3. https://mathworld.wolfram.com/topics/NumericalMethods.html

Course Articulation matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	-	-	1	-	-	-	-	-	-
CO2	3	2	-	-	1	-	-	-	-	-	-
CO3	3	3	2	2	1	-	-	-	-	-	-
CO4	3	3	2	3	1	-	-	-	-	-	-
CO5	3	3	3	3	1	-	-	-	-	-	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By **BOS Approval**

S.Gowtham Prakash, AP(T)/Maths

S.Vadivel, AP(T)/Maths

Date:12.03.26

Subject Code	25EPC402	Subject Title	LINEAR SYSTEMS AND SIGNALS
Category	Professional Core	L-P-T-C	3-1-0-4
Regulation	2025	Semester	IV
Prerequisites			

Course Objectives:

To understand the fundamental concepts and analyze the behavior of signals and systems

Course Content:

[Introduction to Signals and Systems] (9-Hours)

Representation and Classification of signals: continuous-time (CT) and discrete-time (DT) signals, analog and digital , periodic, aperiodic, deterministic, random signals - Elementary signals: unit impulse, step, ramp, exponential, and sinusoidal signals - Signal properties: Energy, power, causality, stability, and invertibility - Signal operations: Shifting, scaling, addition, multiplication, differential and integration - Representation and Classification of systems: static and dynamic, linear/nonlinear, time-invariant/time-variant, causal/noncausal, stable/unstable, feedback and non feedback systems.

[Laplace Transform and Fourier Transform System Analysis] (9-Hours)

Laplace transform and its region of convergence (ROC) - Properties of Laplace Transform –Inverse Laplace transform – Differential equation -Analysis of LTI Continuous time system: Impulse response and Transfer function , Convolution and Deconvolution, System stability and Casuality in s- domain – Realization : Direct form I and form II structure, Cascade and Parallel structure. Fourier Transform of signals - Properties – Analysis of LTI continuous time system: Transfer function in frequency domain – frequency response

[**Z Transform System Analysis] (9-Hours)**

Z-transform and inverse Z-transform - Properties – Difference equation – Analysis : Transfer function of LTI discrete time system, impulse response, convolution and deconvolution , stability in s- domain – relation between s domain and z domain

[**Discrete -Time Fourier Transform and Analysis] (9-Hours)**

Discrete time signals, Classification of Discrete time systems –Convolution and Deconolution - Discrete - Time Fourier Transform (DTFT) – Properties- Analysis: Transfer function in frequency domain , frequency response of first and second order systems , Discrete Fourier Transform (DFT) –properties - Fast Fourier Transform (FFT)

[**Sampling and Applications] (9-Hours)**

- Sampling theorem - Aliasing and its effects - Reconstruction of continuous-time signals from samples - Applications : Signals in control systems - Filtering and modulation concepts - Real-world applications of convolution and transform tools

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Classify and represent various types of signals and systems	L1
CO2	Utilize Fourier analysis and transform techniques for continuous and discrete signals.	L4
CO3	Evaluate convolution, correlation, and response of LTI systems	L5
CO4	Apply Laplace and Z-transforms for system analysis in the s- and z-domains	L3
CO5	Use Filtering and modulation techniques in real world applications	L2

Text Books:

1. A. Nagoor kani, Signals and Systems, McGraw-Hill, 2010
2. Alan V. Oppenheim, Alan S. Willsky, and S. Hamid Nawab, Signals and Systems, 2nd Ed., Pearson. 2015
3. B. P. Lathi, *Principles of Linear Systems and Signals*, Oxford University Press.

Reference Books:

1. A. Anand Kumar, *Signals and Systems*, PHI Learning., 2013
2. Simon Haykin and Barry Van Veen, Signals and Systems, 2nd Ed., Wiley, 2025
3. Hwei P. Hsu, *Schaum's Outline of Signals and Systems*, McGraw-Hill.

COURSE ARTICULATION MATRIX

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	P10	P11	PSO1	PSO2	PSO 3
CO1	3	3	2	2	2	-	1	-	-	-	-	3	2	2
CO2	3	3	3	2	2	1	-	-	-	-	-	3	2	-
CO3	3	2	3	2	2	-	-	2	-	-	-	2	3	2
CO4	2	2	3	3	2	2	-	2	-	-	2	2	2	2
CO5	2	2	2	3	2	-	-	-	-	2	1	3	2	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Name & Designation

Dr.K.Ranjithkumar,Prof/EEE

BOS Approval

Date:13.03.2026

Subject Code	25EPC403	**Subject Title**	**SYNCHRONOUS AND ASYNCHRONOUS MACHINES**
Category	Program core	**L-P-T-C**	3-1-0-4
Regulation	2025	**Semester**	IV
Prerequisites			

Course Objectives:

This course exposure to learn the construction, operation and performance of three-phase induction machines including starting and speed control. It gives construction and performance of salient and non-salient synchronous generators as well as synchronous motor, single-phase induction motors and special machines.

Course Content:

[THREE PHASE INDUCTION MOTOR] (09 Hours)

Construction–Types of rotors–-Principle of operation–Slip–Equivalent circuit–Torque-Slip characteristics-Condition for maximum torque–Losses and efficiency – cogging and crawling-Load test-No load and blocked rotor tests-Circle diagram–Separation of losses– Double cage induction motors–Induction generators – Applications.

[STARTING AND SPEED CONTROL OF THREE PHASE INDUCTIONMOTOR] (09 Hours)

Need for starters–Types of starters–DOL, Rotor resistance, Auto transformer and Star-delta starters–Speed control–Voltage control, Frequency control -V/f control–Slip power recovery scheme-Braking of three phase induction motor: Plugging, dynamic braking and regenerative braking.

[SYNCHRONOUS GENERATOR] (09 Hours)

Construction– Types of rotors–emf equation –Synchronous reactance–Armature reaction–Phasor diagrams of non-salient pole synchronous generator connected to infinite bus—Synchronization and parallel operation– Synchronizing torque-Change of excitation and mechanical input-Voltage regulation–EMF, MMF ,and ZPF methods–steady state power-angle characteristics–Two reaction theory –slip test.

[SYNCHRONOUS MOTOR] (09 Hours)

Principle of operation–Torque equation–Operation on infinite bus bars-V and Inverted V curves –Power input and power developed equations–Starting methods–Current loci for constant power input, constant excitation and constant power developed-Hunting–natural frequency of oscillations– damper windings-synchronous condenser.

[SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES] (09 Hours)

Constructional details of single phase induction motor–Double field revolving theory and Operation– Equivalent circuit–No load and blocked rotor test–Performance analysis–Starting methods of single-phase induction motors–Capacitor-start capacitor run Induction motor-Shaded pole induction motor–Repulsion motor-Hysteresis motor–BLDC motor-Servo motors-Stepper motors- Linear induction motor.

TOTAL: 45 PERIODS

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Understanding the construction and working principle of synchronous, asynchronous and special machines.	L2
CO2	Apply speed control technique for single phase and three phase induction motors.	L3
CO3	Analyze the performance characteristics of synchronous machines.	L4
CO4	Evaluate the performance characteristics of single phase and three phase Induction Machines	L5
CO5	Critically think and develop innovative models of the special electrical machines for various applications.	L5
CO6	Participate actively in group discussion various special types of Induction motors and prepare reports, presentations and documentations across diverse groups.	L3

Text Books:

1. A.E. Fitzgerald, Charles Kingsley, Stephen. D. Umans, “Electric Machinery”, McGraw Hill publishing Company Ltd, 2003.

2. D.P. Kothari and I.J. Nagrath, “Electric Machines”, McGraw Hill Publishing Company Ltd, 2002.

3. Stephen J. Chapman, “Electric Machinery Fundamentals”, 4thedition, McGraw Hill Education Pvt.Ltd, 2010.

Reference Books:

1. *Vincent Del Toro, “Basic Electric Machines”, Pearson India Education, 2016.*

2. *P.S. Bhimbhra, “Electrical Machinery”, Khanna Publishers, 2003.*

3. *M.N. Bandyopadhyay, “Electrical Machines Theory and Practice”, PHI Learning PVT LTD.,New Delhi, 2009.*

4. *B.R.Gupta, “Fundamental of Electric Machines” New ageInternationalPublishers,3rd Edition , Reprint2015.*

5. *Murugesh Kumar, “Electric Machines”, Vikas Publishing House Pvt. Ltd, 2002.*

6. *Alexander S. Langsdorf, “Theory of Alternating-Current Machinery”, McGraw Hill Publications, 2001.*

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	2
CO3	-	3	-	-	-	-	-	-	-	-	-	-	2	3
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	2
CO5	-	-	-	-	-	-	2	3	2	-	-		-	2
CO6	-	-	-	-	-	-	-	-	-	-	3	-	-	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Dr.R.Francis,ASP/EEE

Name & Designation

BOS Approval

Date:13.03.2026

Subject Code	25EPC404	Subject Title	TRANSMISSION AND DISTRIBUTION
Category	Professional Core	L-P-T-C	3-1-0-4
Regulation	2025	Semester	IV
Prerequisites			

Course Objectives:

To make students to develop expression for computation of line parameters and develop equivalent circuits, Analyze the voltage distribution in insulator strings, mechanical design of lines, substation, grounding system and familiar with recent trends in electrical powersystem for the transmission and distribution technically and economically.

Course Content:

[TRANSMISSION LINE PARAMETERS] (9-Hours)

Structure of Power System – Parameters of single and three phase transmission lines with single and double circuits – Resistance, inductance and capacitance of solid, stranded and bundled conductors – Symmetrical and unsymmetrical spacing and transposition – Application of self and mutual GMD – Skin and proximity effects – Typical configurations – Conductor types andelectrical parameters of EHV lines.

[**MODELLING AND PERFORMANCE OF TRANSMISSION LINES] (9-Hours)**

Performance of Transmission lines – Short line, medium line and long line – Equivalent circuits, phasor diagram, attenuation constant, phase constant, surge impedance , Ferranti effect – Transmission efficiency and voltage regulation – Real and reactive power flow in lines – Power circle diagrams–Formation of Corona – Critical Voltages – Effect on Line Performance.

[**MECHANICAL DESIGN OF LINES] (9-Hours)**

Mechanical design of OH lines – Line Supports –Types of towers – Stress and Sag Calculation –Effects of Wind and Ice loading. – Insulators: Types – Voltage distribution in insulator string –Improvement of string efficiency – Testing of insulators.

[**ELECTRIC CABLES] (9-Hours)**

Underground cables – Types of cables – Construction of single core and 3 core cables –Insulation Resistance – Potential Gradient – Capacitance of Single-core and 3 core cables –Grading of cables – Power factor and heating of cables – DC cables, Classes of Cables.

[**DISTRIBUTION SYSTEMS] (9-Hours)**

Distribution Systems – General Aspects – Kelvin's Law – AC and DC distributions –Techniques of Voltage Control and Power factor improvement – Distribution Loss –Types of Substations –Methods of Grounding-various types and standards – Trends in Transmission and Distribution: EHVAC,HVDC and FACTS (Qualitative treatment only).

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Determine the line parameters and analyze the performance of transmission lines	L1
CO2	Acquire knowledge in modelling and design of mechanical characteristics of transmission lines for different weather	L5

	conditions.	
CO3	Design and analyze the underground cables, insulators and exploring the components distribution system.	L4
CO4	Apply the advance techniques for voltage control and power factor improvement in various transmission systems.	L3
CO5	Understand the recent trends in transmission and distribution system.	L2

Text Books:

1. Nagrath, I.J. and Kothari, D.P., "Power System Engineering" Tata McGraw Hill Publishing Company Limited, New Delhi, 2015.
2. C.L.Wadhwa, "Electrical Power Systems", New Academic Science Ltd, 2009.
3. S.N. Singh, "Electric Power Generation, Transmission and Distribution, Prentice Hall ofIndia Pvt. Ltd, New Delhi, Second Edition, 2011.

Reference Books:

1. B.R.Gupta, "Power System Analysis and Design", S. Chand, New Delhi, Fifth Edition,

2. Luces M.Fualken berry, Walter Coffer, "Electrical Power Distribution and Transmission",Pearson Education, 2007.

3 Arun Ingole, "Power Transmission and Distribution" Pearson Education, 2017

4. J.Brian, Hardy and Colin R.Bayliss, "Transmission and Distribution in Electrical Engineering", Newnes; Fourth Edition, 2012.

5. G.Ramamurthy, "Handbook of Electrical Power Distribution," Universities Press, 2013.

6. V.K.Mehta, Rohit Mehta, "Principles of Power System", S. Chand & Company Ltd, New Delhi, 2013

COURSE ARTICULATION MATRIX

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	P10	P11	PSO1	PSO2	PSO 3
CO1	2	3	2	-	2	-	1	-	-	-	-	3	2	2
CO2	2	2	3	2	1	1	-	-	-	-	-	3	2	-
CO3	3	2	3	2	2	-	-	2		-	-	2	3	2
CO4	3	3	1	3	2	2	-	2	-	-	2	2	2	2
CO5	3	2	2	-	2	-	-	-	2	2	1	3	2	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Dr.V.Adhimoorthy, ASP/EEE

Name & Designation

BOS Approval

Date:13.03.2026

Subject Code	25EPC405	Subject Title	Linear Integrated Circuits and Applications
Category	PC	L-P-T-C	3-0-0-3
Regulation	2025	Semester	IV
Prerequisites	Electric Circuit Analysis, Analog Electronics		

Course Objectives:

1. To acquire knowledge on operational amplifier (Op-Amp), Special and Application IC's.
2. To develop Op-Amp and special ICs based circuits.

Course Content:

Basics and Characteristics of OP-AMP (9 Hours)

Current mirror and current sources - differential amplifier - OP-AMP stages - Ideal OP-AMP characteristics – DC characteristics – AC characteristics – CMRR – Frequency response of OP-AMP – Basic applications of op-amp – Inverting and Non-inverting Amplifiers – adder, subtractor, scale changer, voltage follower.

OP-AMP Applications (9 Hours)

Instrumentation amplifier and its applications for transducer Bridge – differentiator and integrator - Log and Antilog Amplifiers – Analog multiplier & Divider – Comparators – zero crossing detector - Schmitt trigger – limitations of Op-Amps as Comparators – Window detector Clippers – Clampers – precision diode - precision rectifier - Peak detector – Sample-and-Hold circuit.

Active Filters and Oscillators (9 Hours)

First and Second order active Low Pass and High Pass Butterworth Filters – phase shift oscillator – wien bridge oscillator – square wave generator – triangulator wave generator – sawtooth wave generator.

A/D and D/A Converter (9 Hours)

D/A converter – specifications, weighted resistor types, R-2R ladder type - A/D converters – specifications, Flash type, Successive Approximation type, Single slope type, Dual slope type, A/D converters using voltage to time conversion, counter type converter, introduction to over sampling and sigma to delta A/D converters.

Special ICs and Applications (9 Hours)

Functional block and characteristics of 555 Timer – PWM application – IC 566 voltage controlled oscillator – IC 565-phase locked loop IC – AD623 Instrumentation Amplifier – IC voltage regulators – Dual tracking regulators (78XX & 79XX Series) – LM317, 723 Variability voltage regulators – Switching regulator – SMPS.

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	Course Outcome	Bloom's Level
CO1	Explain the characteristics, applications of Op-Amp and special ICs.	-
CO2	Apply the characteristics of Op-Amp and special ICs with the knowledge of electrical engineering fundamentals and mathematics to construct the circuits such as instrumentation amplifier, active filters, comparators, waveform generator, analog multiplier, voltage regulator, D/A and A/D converters for solving engineering problems.	PO1-3
CO3	Analyse the given Op-Amp and special ICs based circuits and obtain output / mathematical representation / trouble shoot the circuit.	PO2-3
CO4	Design Op-Amp circuits, waveform generator, timing circuits, analog multiplier, instrumentation amplifier, PLL, voltage regulator, D/A and A/D converters to develop a specified practical solutions.	PO3-2
CO5	Function efficiently as a team member to design practical engineering solutions in linear integrated circuits using relevant engineering tools, and Convey the results through organized technical reports and oral presentations.	PO4-1 PO5-1 PO10-1 PO11-1

TEXTBOOKS:

4. David A. Bell, "Op-amp & Linear ICs", Oxford, 2013
5. D. Roy Choudhary, Sheil B. Jani, "Linear Integrated Circuits", II edition, New Age, 2003.
6. Ramakant A.Gayakward, "Op-amps and Linear Integrated Circuits", IV edition, Pearson Education, 2003 / PHI. 2000.

REFERENCES:

5. Fiore, "Opamps & Linear Integrated Circuits Concepts & applications", Cengage, 2010.
6. Floyd , Buchla, "Fundamentals of Analog Circuits, Pearson, 2013.
7. Jacob Millman, Christos C.Halkias, "Integrated Electronics - Analog and Digital circuits system", McGraw Hill, 2003.
8. Robert F.Coughlin, Fredrick F. Driscoll, "Op-amp and Linear ICs", Pearson, 6th edition, 2012.

9. Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", Mc Graw Hill, 2016.

10. Muhammad H. Rashid, "Microelectronic Circuits – Analysis and Design" Cengage Learning, 2011.

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	2	2	1
CO2	3	-	-	-	-		-	-	-	-	-	-	3	1	1
CO3	-	3	-	-	-		-	-	-	-	-	-	3	2	1
CO4	-	-	2	-	-	-	-	-	-	-	-		3	1	1
CO5	-	-	-	1	1	-	-	-	-	1	1		2	1	1

1-Low, 2- Moderate, 3-High

Course Designed By
Dr.I.Thangaraju,AP/EEE

BOS Approval
Date:13.03.2026

Course code	25ZBS406	**Course Title**	Environmental Sciences and Sustainability
Category	Basic Science	**L-P-T-C**	2-0-0-2
Regulation	R-2025	**Semester**	04
Prerequisites	Nil		

Course Objectives:

1. To define key terms, concepts, and principles of environmental science, ecology, biodiversity, pollution, environmental laws and sustainability.
2. To understand the inter relationship between environment and living organisms. Environmental literacy: 1) Where do the things I consume come from?
   2) What do I know about the place where I live?
   3) What is my responsibility as a human being?
3. To equip students to apply environmental principles and scientific methods to solve real-world environmental problems.
4. To enable the students to analyse complex environmental issues, their root causes and connections between environmental, social, and economic systems.
5. To evaluate the waste management strategies, energy efficiency, carbon footprints and standards regarding environmental policies and sustainable practices.

ENVIRONMENT AND BIODIVERSITY 6 hours

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India –conservation of biodiversity: In-situ and ex-situ.

ENVIRONMENTAL POLLUTION 6 hours

Pollution: Definition - Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Hazardous waste: definition – types - Solid waste - Solid waste management - waste disposal methods – E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

RENEWABLE SOURCES OF ENERGY 6 hours

Renewable and non-renewable energy resources - Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

SUSTAINABILITY AND MANAGEMENT 6 hours

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

SUSTAINABILITY PRACTICES 6 hours

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socioeconomical and technological change.

TOTAL: 30 PERIODS

Upon successful completion of this course, student will be able to,		
CO	**Course Outcome**	**Bloom's Level**
CO1	Environmental problems cannot be solved by mere laws. Public awareness is an important aspect which defines the importance of environment conservation and its benefits.	L1
CO2	The key goals of environmental literacy will help the students, to make a leap from 1) YES 'I KNOW' about MY Environment. 2) 'I will CARE' for MY Environment. 3) 'I'II RESPECT and CONSERVE MY Environment.	L2
CO3	Apply environmental laws and regulations to specific case studies. Implement new technologies in solving environmental problems can move towards health, longevity, peace and prosperity.	L3
CO4	Analysing the values and attitudes towards understanding complex environmental-economic-social challenges, and participating actively in solving current environmental problems by adopting sustainability as a practice in life, society and industry.	L4
CO5	Evaluate and design an eco-friendly product or a green technology solution for improving environmental quality and develop a better understanding of human relationships, perceptions and policies towards the environment.	L5

Text Books:

1. G. Tyler Miller & Scott Spoolman, "Environmental Science" 16th edition, Cengage Learning India Pvt. Ltd., 2023.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.

Reference Books:

1. R K Trivedy, "Handbook of Environmental Laws, Acts, Guidelines, Compliances & Standards" Vol.I, B.S. Publications, 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopaedia", 2nd Edition, Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice Hall of India Pvt. Ltd., New Delhi,2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press 2005.
5. Bharucha Erach, "The Biodiversity of India", Mapin Publishing Pvt. Ltd., Ahmedabad India.

COURSE ARTICULATION MATRIX											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	1	1	2	1	1	2		1	1		1
CO2	1	1	1	1	1	2		1	1		2
CO3	1		1	1	1	2		1			2
CO4	1	1	3	1	2	2		1	1		2
CO5	1	1	1	1	2	2		1	1		2

Correlation Levels: 3 – Strong, 2 – Medium, 1 – Low and (-) No correlation

Course Designed by

1. **Dr.G.SARASWATHY,**
   ASP & Head/Chemistry.

2. Dr.S.ELUMALAI, AP/Chemistry.

25EPC407	SYNCHRONOUS AND ASYNCHRONOUS MACHINES LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

This practical course give exposure to the students about the operation and characteristics of induction machines, synchronous machines and AC starters.

LIST OFEXPERIMENTS

1. Load test on three-phase induction motor.
2. No load and blocked rotor tests on three-phase induction motor (Determination of equivalent circuit parameters).
3. Separation of No-load loss of three-phase induction motor.
4. Regulation of three phase alternator by EMF and MMF methods.
5. Regulation of three phase alternator by ZPF method.
6. Regulation of three phase salient pole alternator by slip test.
7. Load test on Three Phase alternators with RL load.
8. V and Inverted V curves of Three Phase Synchronous Motor.
9. Load test on single-phase induction motor.
10. No load and blocked rotor test on single-phase induction motor.
11. Study of Induction motor Starters.
12. Parallel operation of Three Phase Alternators.

TOTAL :45 PERIODS

OUTCOMES: After completion of this course, the student will be able to:

1.	Identify the induction machine for real time applications.
2.	Apply suitable starters for AC induction machines.
3.	Determine the voltage regulation and analyze the performance of alternators.
4.	Analyze and operate the synchronous machine for real time applications.

LIST OFEQUIPMENT FOR A BATCH OF30 STUDENTS:

1. Synchronous Induction motor 3HP– 1 No.
2. DC Shunt Motor Coupled With Three phase Alternator– 4 nos
3. DC Shunt Motor Coupled With Three phase Slip ring Induction motor– 1 No.
4. Three Phase Induction Motor with Loading Arrangement– 2 nos
5. Single Phase Induction Motor with Loading Arrangement– 2 nos
6. Tachometer -Digital/Analog – 8 nos
7. Single Phase Auto Transformer – 2 nos
8. Three Phase Auto Transformer– 3 nos
9. Single Phase Resistive Loading Bank– 2 nos
10. Three Phase Resistive Loading Bank– 2 nos

COURSE ARTICULATION MATRIX

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	-	3	2	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	3	3	-	-	-	-	-	-	-	-	3	-
CO4	-	-	-	3	2	-	-	-	-	-	-	-	-	2	3

1-Low, 2-Moderate (Medium), 3

Course Designed By **BOS Approval**

Dr.R.Francis,ASP/EEE

Name & Designation Date: 13.03.2026

Subject Code	**25EPC408**	**Subject Title**	**Linear and Digital Integrated Circuits and Applications Laboratory**
Category	ES	**L-T-P-C**	**0-0-3-1.5**
Regulation	2025	**Semester**	IV
Prerequisites	Electric Circuit Analysis, Analog Electronics		

Course Objectives:

- To design, test and characterize the circuit behavior using analog and digital ICs.

Course Content:

List of Experiments:

1. Implementation of Boolean Functions, Adder and Subtractor circuits.
2. Code converters: Excess-3 to BCD and Binary to Gray code converter and vice-versa
3. Parity generator and parity checking.
4. Encoders and Decoders.
5. Counters: Design and implementation of 3-bit modulo counters as synchronous and Asynchronous types using FFIC's and specific counter IC.
6. Shift Registers: Design and implementation of 4-bitshift registers in SISO, SIPO, PISO, PIPO modes using suitability IC's.
7. Timer IC application: Study of NE/SE 555 timer in Astability, Monostability operation.
8. Application of Op-Amp: inverting and non-inverting amplifier, Adder, comparator, Integrator Differentiator and Differential Amplifier.
9. Voltage to frequency characteristics of NE/ SE 566IC
10. Variability Voltage Regulator using ICLM317.
11. Introduction to VHDL Simulation

Total Hours: 45

Upon successful completion of this course, students will be able to:

CO	**Course Outcome**	**Bloom's Level**
CO1	Acquire knowledge on code converters, encoder/ decoder, counters, shift register, timers, Op-Amp application and voltage regulators ICs	-
CO2	Design and implement code converters, encoder/ decoder, counters, shift register Op-Amp circuits, waveform generator, timing circuits, voltage regulator to develop a specified practical solutions.	PO2-3
CO3	As a member of team, Design code converters, encoder/ decoder, counters, shift register Op-Amp circuits, waveform generator, timing circuits, voltage regulator, to develop a specified practical solutions and VHDL simulation.	PO5-2 PO8-3 PO9-2 PO10-1

REFERENCES:	
1.	James W. Bignel, Digital Electronics, Cengage learning, 5th Edition, 2007.
2.	M. Morris Mano, ′Digital Design with an introduction to the VHDL′, Pearson Education, 2013.
3.	D. Roy Choudhary, Sheil B. Jani, ″Linear Integrated Circuits″, II edition, New Age, 2003.
4.	Ramakant A.Gayakward, ″Op-amps and Linear Integrated Circuits″, IV edition, Pearson Education, 2003 / PHI. 2000.

Course Designed By

Dr.I.Thangaraju,AP/EEE

BOS Approval

Date: 10.03.2026

Subject Code	25ZHS410	**Subject Title**	**SOFT SKILLS AND PERSONALITY DEVELOPMENT LABORATORY**
Category	HSMC	**L-T-P-C**	**0-0-3-1.5**
Regulation	2025	**Semester**	IV
Prerequisites	Effective writing skills, critical thinking and presentation skills.		

Course Objectives:

1. To develop active listening proficiency and professional conversational skills.
2. To enhance core personality traits and facilitate effective career planning.
3. To equip students with the ability to produce a wide range of written artifacts, from creative writing and book reviews to technical documents.
4. To prepare students for the professional recruitment process by training them through mock interview, group discussion strategies, and leadership coordination.
5. To provide a comprehensive orientation for national and international examinations, focusing on verbal ability and exam-specific requirements.

Course Content:

[Listening Skills] (9 Hours)

Types of Listening – Listening Barriers - Conversational Skills (formal and informal) – Listening to Debates, Documentaries - Listening to Lectures - Discussions on TV/ Radio/ Podcast.

[Speaking / Writing Skills] (9 Hours)

Distinction between Letters and Sounds – Creative Writing - Writing different types of Applications and Complaints - Writing reviews - Thesis Writing – Posture Making – Advertisement - Magazine Preparation – Non-verbal Communication Clues

[English for National and International Examinations and Placements] (9 Hours)

International English Language Testing System (IELTS) - Test of English as a Foreign Language(TOEFL) - Civil Service Examinations (Language related) - Verbal Ability – Graduate Record Examinations (GRE) – Railway Recruitment Board (RRB) – Staff Selection Commission (SSC) – Union Public Service Commission (UPSC) – Banking Recruitment (BRB).

[Soft Skills] (9 Hours)

Motivation- Emotional Intelligence-Multiple Intelligences- Career Planning - Creative and Critical Thinking- Time Management and Effective Planning- Stress Management – Computer and Internet Skills – Entrepreneurial Skills – Personality Development – Psychometric – Assertiveness.

[Employability Skills] (9 Hours)

Letter Writing – Resume writing – LinkedIn login - Presentation Skills – Oral Reporting –Interview skills – Types of Interview, Preparation for Interview, Mock Interview – Conversation – Debate - Group Discussion - Leadership and Co-ordination – Causes and Effect- Stress Relief Techniques.

Total Hours: 45

Upon successful completion of this course, students will be able to

Text Books:

CO	COURSE OUTCOMES	Bloom's Level
CO1	Identify phonetic sounds and recall various English accents to enhance listening comprehension and conversational proficiency.	L1
CO2	Explain the structure of international exams (IELTS/TOEFL) and interpret non-verbal communication cues in various contexts.	L2
CO3	Apply professional interview techniques, presentation skills, and stress-management strategies in mock placement scenarios.	L3
CO4	Analyze and differentiate between various leadership styles and soft skills, such as emotional intelligence, to formulate career plans.	L4
CO5	Evaluate and critique creative writing pieces, book reviews, and thesis structures to refine analytical and critical thinking.	L5

Text Books:

1."Soft Skills, MJP Publishers, Chennai, 2010.

2.Communication Skills and Soft Skills An Integrated Approach, Dorling Kindersley (INDIA) PVT.LTD, New Delhi, 2012.

3. Communication Skills for Engineers and Scientists, PHI Learning PVT.LTD, Delhi, 2014

References Books:

4. Craven, Miles. Listening Extra-A resource book of multi-level skills activities. Cambridge University Press, 2004.
5. Seely, John. The Oxford guide to writing & Speaking. New Delhi: Oxford University Press,20
6. Comfort, Jeremy, et al. Speaking Effectively: Developing speaking skills for Business English. Cambridge University Press, Cambridge: Reprint 2011.
7. Dutt P. Kiranmai and RajeevanGeetha. Basic Communication Skills, Foundation Book: 2013.

E-resources:

1. onlinecourses.nptel.ac.in/noc20hs56/preview
2. swayam.gov.in

Course Articulation Matrix:

CO	Program Outcomes (PO)										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
CO1	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	-	-	-	3	-	-
CO3	-	-	-	-	-	-	-	2	3	2	-
CO4	-	-	-	-	-	-	-	3	3	2	2
CO5	-	-	-	-	-	-	-	-	3	-	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Dr. A. Jesu Steephan Samy. AP/Eng.

BOS Approval

Date: 12.03.2026